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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, JANUARY 5, 1884.

VOLUME XLVIII
Number 1.

Anderson's Concentrating Mill.

David H. Anderson, of Butte City, Montana, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency, a new amalgamating and concentrating appliance which consists of a series of circularly moving and rocking pans, placed in descending steps, each one receiving the discharge from that above it through suitable gates, chutes and receivers. Peculiar mechanism is adopted to work these pans. The engravings we give herewith represent the pans; and also a whole concentrating mill, the latter being shown by the cuts on pages 8 and 9, and the concentrator itself on this page. Fig. 1 is a side elevation of the concentrating pans. Fig. 2 is a rear view of the concentrator, and Fig. 3 is a plan view.

The pans or bowls, *A A*, to receive the material to be worked have rims projecting inwardly to prevent splashing of pulp. The pans are supported on transverse shafts, *B B*, which extend across beneath them just forward of the center, and their rear sides are supported by vertical rods, *C C*. The shafts, *B*, are secured in boxes beneath the pans, and their ends project so as to be connected with the wrist-pins, *D*. The shafts *F F* support on their ends and rotate disks, *E*, said disks being provided with slots through which project wrist-pins, *D*. The wrist-pins are intended to be adjusted by means of nuts to or from the center of the disks to give a longer or shorter throw to the crank thus formed, and by their movement the pans are given a curvilinear reciprocating motion.

The vertical shafts *F*, to which the disks, *E*, are fixed, extend down to the lower part of the apparatus, and have bevel gears, *E*, *G*, fixed near their lower ends, their ends in steps turning upon the frame work or bed. Transverse shafts extend across this frame-work, and these carry bevel gears, *J J*, which mesh with the wheels, *G*, and thus rotate the vertical shafts *F*, and disks *E*. New shafts may be driven by belt pulleys. Another shaft, *L*, extends longitudinally from end to end of the frame and has cam wheels, *M*, fixed to it beneath the rear portion of each pan. These cams serve to give the vertical rods *C*, an up and down movement, and through them the pans are caused to rock upon their horizontal supporting axes. The drawing shows the vertical movement imparted to the rods *C*, by means of transverse levers *N*, one end of each of which is pivoted to the frames to form a fulcrum, while the other end has the rod *C*, connected with it by a pivoted joint. A roller, *O*, is journaled upon the side of each lever, *N*, in such a position as to be acted upon by the cam, *M*, as it rotates. Only one letter *M* is shown, but there is one for each pan; and the reciprocating motion there imparted to the levers is transmitted to the rods, *C*, and through them to the pans. The rods, *C*, are attached to the rear of the pans by a swiveling connection, *P*, allowing the rods to raise and lower the rear of the pan without interfering with any of its other movements. Each of

the vessels, *A*, has a chute or receiver, *P*, upon its upper side and a distributor, *Q*, upon its lower side. The receiver on the first pan is supplied from the battery or other crushing or pulverizing apparatus through suitable connecting chutes, and the receivers of the follow-

a receiver *U*, so that the concentration may be led to any desired point.

The operation is as follows: The pulp is let into the upper pan and distributed and settled by the peculiar motions imparted to it, the heavier particles settling to the bottom, and

will be again settled, and so on to the end of the series, so that the different grades and values will be separated at one operation.

In some cases it is desirable to give the pans a parallel circular motion: in others a compound circular motion, by means of the horizontal disks and crank or wrist pins. The latter movement is effected by means of another set of gear wheels upon the horizontal transverse shaft, and upon the opposite side of the gears *G*, from *J*. Both these gears *J*, and the others have feathers in the shaft so they are connected or disengaged. When the gears on the same side relatively meet with their corresponding gears *G*, the movement of the gears *G* will be in the same direction, and the pan will be given a single circular motion about the center of the wheels *G*; but if the two inside gears are engaged with *G*, it will produce a movement of these gears in opposite directions and give the pan a compound motion.

The object of the parallel circular motion is to move the vessel equally in all directions, thereby imparting to the pulverized ore, sand and debris an even movement as they pass over or through the vessel. The object of the compound circular motion is to agitate the passing material mostly in a sidewise or oscillatory manner around the center of the pan, while creating but little motion in the direction in which the material flows across the vessel. This movement is especially useful for saving the lighter metals, and gives the machine a better settling action than what Mr. Anderson terms the "parallel motion."

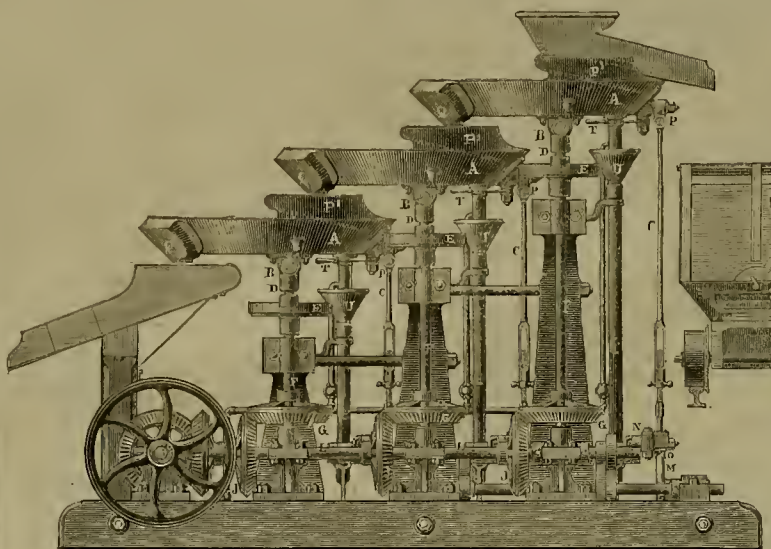
The drawings show Mr. Anderson's device as arranged by him. In some cases he puts hoppers inside of the pans on the receiving side, and above the level of the material to be worked, instead of being attached to the outer side, so as to shorten the machine. Mr. Anderson, with one of these machines, took out of the mill tailings of the Burlington mill, near Butte City, in ten days' running and experimenting, 4,000 ounces of silver, 27 tanks of quicksilver, and 90 tons of concentrates, assaying 98 ounces silver per ton and 65 per cent carbonate of lead. The machine worked at the rate of five tons per hour. Mr. Anderson is a practical mill builder and mechanical and mining engineer. This is not his first invention in the line of metallurgical appliances.

The machines are run in combination with stamp batteries for gold amalgamation and concentration. The mode of operation is to add mercury in the mortar of the battery; close the valve of the upper pan of the machine and charge with sufficient mercury to cover the bottom of the pan, so as to amalgamate the free gold.

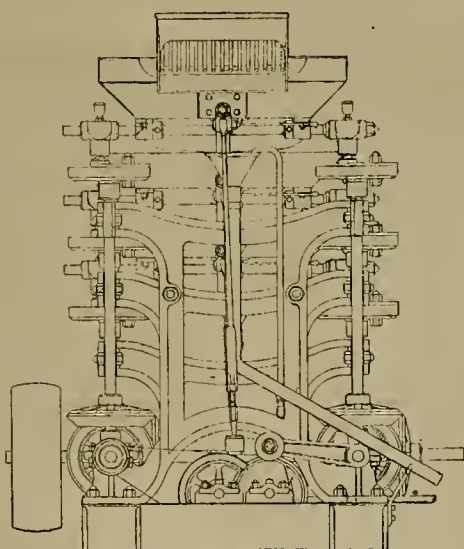
Then concentrate the sulphurets and metals from the ores with the two lower pans, regulating the valves in the bottom of the pan for continuous discharge, or at intervals if these ores have not much "concentrates."

For working mill tailings the machines are run by portable engines, and supplied by electro-

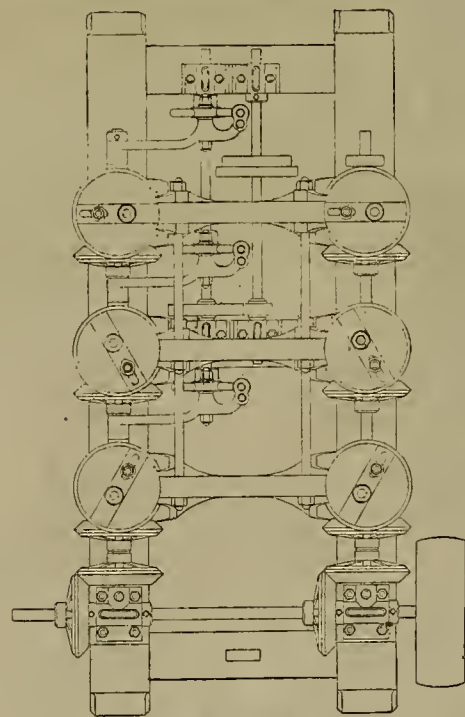
(CONTINUED ON PAGE 8.)



SIDE ELEVATION OF ANDERSON'S CONCENTRATING PANS.



REAR VIEW OF CONCENTRATOR.



PLAN VIEW OF CONCENTRATOR.

ing pans are supplied from the distributors of those preceding them. Long slots open from the receivers into the pan, and similar slots open from the opposite sides of the pan into the distributors. The material is thus evenly distributed over the bottom of the pans.

Each pan is provided with one or more valves or gates in its bottom. These valves are operated by levers *T*, by which the amount of opening and rate of discharge may be accurately governed. Beneath the discharge openings is

the lighter arranging themselves above and flowing through openings at the side into the distributor, and thence into the next pan.

If it be desired to amalgamate the free gold and silver at the same time that the concentration is being accomplished, mercury may be put in one or more pans. The heavier metals—gold, silver and mercury—will thus remain at the bottom of the first pan, and the lighter metals will be discharged through the distributor *Q* into the next pan, where the heavier

CORRESPONDENCE.

Precipitation of Gold.

EDITORS PRESS:—In the PRESS of November 3d, in C. H. Aaron's article on "Precipitation of Gold," he writes as follows: "It appears, however, that the gold terchloride causes oxidation of both the copper and sulphur, and it will be readily seen that gold in the presence of a copper salt may be precipitated in metallic state, and but little contaminated by copper sulphide, by means of hydrogen sulphide, and may be further purified by washing in a bath of fresh solution of gold." Also, in the appended paragraph: "If their leach contains copper it seems possible that hydrogen sulphide might cause the same trouble"—i. e., formation of sulphuric acid and consequent precipitation of lime as sulphate.

Judging from accepted methods in standard schemes of chemical analysis, and from carefully performed experiments, I venture to assert that he has drawn incorrect conclusions. I would thus respectfully lay the matter before the readers of the PRESS.

If sulphuric acid were formed, and gold precipitated as metal in treating the solution with hydrogen sulphide, two very serious defects must exist in Fresenius' system of analysis. (a) Barium and strontium would be precipitated as sulphates by treatment with hydrogen sulphide in presence of gold and copper, and would not be found in their proper place. (b) The metallic gold would not dissolve in ammonium sulphide, thus failing of detection. I refer to Fresenius. See his Qualitative Analysis by Johnson, p. 369. This is directly contrary to Mr. Aaron's statement.

In order to verify this experimentally, I prepared two solutions containing both gold and copper, one by means of aqua regia, the other by chlorination. Both were treated with hydrogen sulphide to saturation. Had sulphuric acid been formed, it would have remained in the solution. After filtering barium chloride failed to reveal any trace of sulphuric acid in either solution. Had the gold been thrown down as metal it would have failed of solution in ammonium sulphide. After thoroughly washing the hydrogen sulphide precipitate with yellow ammonium sulphide, not a trace of gold could be found in the residue, while it was found in the washings; thus showing that the gold must have been precipitated as sulphide.

I conclude that hydrogen sulphides precipitates both gold and copper as sulphides, neither one as metal, and that no sulphates are formed. Indeed I can not conceive how this oxidizing action could obtain in the presence of so powerful a reducing agent as hydrogen sulphide.

No fear of trouble with lime in the leach need be entertained when hydrogen sulphide is used to precipitate the gold. But the copper also goes down with the gold, though, perhaps, as Mr. Aaron says, it may be replaced by metallic gold upon washing with fresh gold solution. In this case I can readily imagine the sulphur and copper as being oxidized by the gold terchloride, free hydrogen sulphide being absent. I have not experimented upon this.

Ferrous chloride is doubtless the best precipitant to use in presence of lime, as neither the latter nor copper would be precipitated, while the metallic state of the gold renders subsequent roasting needless.

Mr. Aaron states in the same article that proto-chloride of manganese answers for precipitation of gold. I take issue with him upon this point. I not only find that the proto-chloride free from iron fails to precipitate gold, but that the per chloride actually chlorinates metallic gold, bringing it into solution as chloride, and becoming reduced meanwhile to proto-chloride. Indeed the perchloride spontaneously evolves chlorine and becomes the proto-salt.

The waste liquor from the chlorine generator contains an excess of acid and some iron as per salt, both of which may be utilized by addition of scrap iron. But when this is used for precipitation the iron is the reducing agent; the manganese remains inactive.

Were manganese available, as he states, it could be used alternately for precipitation and chlorination, thus reducing cost of gold leaching. Signal, Arizona. N. A. BOLES.

MINING IN FRANCE.—The greater portion—two-thirds—of the total annual production of coal in France comes from the northern coal districts of the Nord and Pas de Calais, and from the basin running southward through the departments of the Loire, Rhone, Ardeche, and Gard to the Gulf of Lyons. The production amounted to 21,000,000 tons in 1882, which is less than one-seventh that of Great Britain, less than half the production of Germany, and about one-quarter that of the United States. As early as the eleventh century the coal mines of Saint-Etienne were known, but were not worked to any great extent until the Revolution. The northern coalfields were discovered in 1847. The consumption of coal in France last year was about 10,000,000 more tons than she produced. Although large quantities of iron ore is imported by France, the country is rich in iron mines.

THE Iron Mining Company, of Hotelling, has purchased the iron mine in Shasta county, near the United States Fishery.

Manganese.

Sources.

Manganese is found in deposits of various oxides extending through the Atlantic States from Maryland to Georgia. The mines furnishing the most valuable ore at present are located in the "Etowab region" in Bartow county, Georgia. From 500 to 1,000 tons are here mined annually, and while this is less than is produced in Virginia the higher percentage of manganese in the Georgia ore makes it a more important feature of the total supply. The deposits in Virginia rank next in importance. The mines are numerous and furnish a total of from 2,000 to 3,000 tons. One mine alone in Augusta county yields 1,500 tons annually. These two sources are the only ones which enter into the manganese industry to any extent. The information concerning them was furnished by Mr. C. L. Oudsluys. There are large deposits of ore at Warminster, on the estate of Mr. Philip Cabell, in Nelson county; and also in Rockingham and Campbell counties. Near Harper's Ferry, in Jefferson county, West Virginia, there is a mine which was formerly worked, and ore is again met with in the northwestern part of this State. There are deposits in North Carolina, but of such hard quality that it is not profitable to work them. Greenville, South Carolina, has furnished a small quantity to the trade, but the quality, like that of the Virginia ore, is too poor to render it of much value. The same is true of more extensive deposits in Tennessee, where, in spite of a few exceptionally rich veins, the ore falls below the average.

The ores of manganese have been observed at many different places on the Pacific coast, the heaviest deposits yet discovered, or at least opened up, being on Red Rock, a small island in the Bay of San Francisco, 10 miles north of this city. Information regarding this occurrence is furnished by Mr. C. G. Yale. This island contains 27 acres, and rises to a height of 250 feet above the water. The ore, which is of the gray variety (pyrolusite), occurs in large masses, distributed through a black, flinty gangue, a heavy belt of which extends for seven or eight hundred feet across the island. The exploratory work here consists of a tunnel, which intersects the ore channel at the depth of 200 feet, and several drifts run and pits sunk on it higher up. This work was done in 1866, at which time over 200 tons of ore carrying 70 per cent binoxide were extracted and sent to New York with a view to testing its commercial value. As this lot sold for less than freight and commissions, the work of ore-extraction was discontinued and has not since been resumed. The cost of taking out the ore and delivering it in San Francisco amounted at that time to \$10 per ton. As this is twice as much as the same service would now cost, and there is likely to grow up some demand for manganese for local uses, there is a probability of this mine again being worked at an early day.

Many other occurrences of pyrolusite, said to be in workable quantities, are reported but not utilized, in the Far West. In the Mammoth district, Nye county, Nevada, occur a large deposit of the tungstate of manganese.

Small quantities of very pure manganese dioxide are imported from Nova Scotia, for use in neutralizing the green tint imparted to flint glass by minute traces of iron. The Nova Scotia ore is remarkably free from iron, and hence its value in the glass industry. Sulphate and chloride of manganese and potassium permanganate are the only other salts which have thus far found any industrial application in the American arts. Permanganate is imported in small quantity from Germany, and is worth from 50 to 70 cents per pound in this country. It is safe to prophesy that in the near future another salt of manganese—manganate borate—will be largely used in the United States, as it already is in Germany, Austria and France, for hoiling with linseed oil and fine varnishes. According to the most experienced varnish manufacturers, manganate borate offers an aid in making driers, superior to that of any other substances.

Character of the Ores

The three prominent ores of manganese are: 1, black oxide, or pyrolusite (MnO_2); 2, braunite, or brown oxide of manganese (Mn_2O_3); 3, manganiferous iron ore. It is very rarely, if ever, the case that the ore is found in a state of purity approaching the composition of a definite mineral. It is usually a mixture of black and brown oxides of manganese and ferrous and ferric oxides of iron, in varying proportions, and the commercial name given is intended to designate the predominating feature of the ore. If, as is sometimes the case with Georgia ore, the amount of manganese reaches the neighborhood of 80 per cent, and the substance shows some crystalline form and is soft, it is called by the proper mineralogical name, "pyrolusite." But ordinary ore containing less than 75 per cent of MnO_2 is called "black oxide" of manganese. If, however, the amount of manganese dioxide runs as low as 20 to 30 per cent and oxide of iron becomes the dominant ore, it is called "manganiferous iron ore." Black oxide is the only manganese ore mined in this country, and if the manganese dioxide in it falls much below 60 per cent, it is not worth bringing to the market. It may be said that the Virginia ore usually contains about 60 per cent, while Georgia ore runs from 66 to 70 per cent. The manganiferous iron ore

found in the United States usually contains phosphorus, sometimes to the extent of one to two per cent. Even five one-hundredths of one per cent of phosphorus renders steel "cold short" (that is, brittle when cold), and this more than counter-balances the beneficial effect of adding manganese in the manner stated later in this notice. A few other substances are always present in the ores, as is shown by the following table of analyses of samples from the places named:

Analyses of Black Oxide of Manganese.

	Georgia Ore.	Ore from Campbell Co., Va.
Water.....	1.17	1.05
Silica.....	4.00	21.76
Manganese dioxide.....	66.40	57.60
Ferric oxide.....	10.08	9.93
Barium sulphate.....	.29	1.05
Calcium carbonate.....	trace	.85
Oxides of manganese other than dioxide.....	18.06	7.76
Total.....	100.00	100.00

Quantity Mined.

The total quantity of manganese ores mined in 1882 was very nearly 3,500 tons (of 2,240 pounds). Its spot value at the mines is \$11 to \$20 per long ton, according to the percentage of manganese. The cost of mining is from \$5 to \$10 per ton.

Utilization.

The chief use of manganese ores is as a ready and easily available source of oxygen. For this reason the dioxide is the only valuable constituent, because it can be made to give up its oxygen by several means. Advantage is taken of this oxidizing power of the dioxide in the preparation of chlorine and bromine. It is extremely difficult to separate these elements from other elements with which they are ordinarily in combination. It is a simple matter, however, to obtain hydrochloric acid; and when manganese dioxide is added to this, its oxygen unites with the hydrogen, forming water, and leaves part of the chlorine free. As it is very difficult to transport chlorine in its ordinary gaseous state, it is passed over slaked lime, and thus made into "bleaching powder," which is a mixture of chloride and hypochlorite of calcium. Bromine is made by a similar process, but as it is a liquid, it is not necessary to convert it into a substance analogous to bleaching powder. These processes, which consume probably three-quarters of the manganese mined in this country, are carried on at several places near Pomeroy, on the Ohio river, and at a few other points in the United States. Where manganese ore richer than 70 per cent is obtained, it is usually found profitable to send it to England for the manufacture of bleaching powder, and a small proportion of the yearly supply is thus annually exported. This is the only case of the exportation of manganese. Manganese ore is also used as an oxidizing agent in boiling linseed oil and varnish. When linseed oil is boiled with powdered manganese dioxides, the oil takes up a certain amount of oxygen and becomes thick, drying rapidly. It is doubtful whether the manganese dioxide does more in this case than to expose a greater surface of the oil to the oxidizing effect of the air, for the mineral does not appear to lose its efficiency after continual use. Manganese dioxide is also used in the preparation of oxygen, but only when mixed with chlorate of potassium; because manganese dioxide requires a very high temperature when heated alone before it will give up its oxygen. When heated with potassium chlorate the latter yields its oxygen at a comparatively low temperature, the dioxide serving only to distribute the heat through the mass.

So far as can be ascertained, these are the only uses for which the native ores of the United States are at present available. There are two or three uses into which the manganese itself enters; but, for these, foreign ores are used altogether. Considerable quantities of manganiferous iron ore are imported, principally from Carthage, Spain. The ore is brought as ballast in sailing vessels and steamers coming to American ports in search of cargoes. Probably the largest amount comes to Baltimore, but some is also received in Philadelphia and New York. The following table gives the importations of manganiferous iron ore received in Baltimore during 1882. The percentage of manganese is also stated:

Date of Arrival.	Amount, Tons.	Metallic Manganese, Per cent.
April 25th.....	800	17.10
April 28th.....	800	5.93
July 15th.....	2,800	12.84
July 22d.....	800	3.77
August 16th.....	2,000	12.66
August 30th.....	2,000	15.75
September 4th.....	900	15.85
October 10th.....	2,000	15.83
November 28th (in bond).....	4,000	.....
December—(in bond).....	1,000	.....
Total.....	17,100	.....

The imported ore contains an average of about 20 per cent manganese dioxide, so the ore which enters this country is about equal to that mined here. This form of ore is all used in making a superior variety of steel. It has been found that when a small quantity of manganese—less than three per cent of the steel to be melted—is added to steel in the melting pot, inferior steel may be raised to a high grade, and is made capable of welding with iron. This was discovered in 1829 by Mr. Josiah Marshall Heath, who proposed the addition of manganese dioxide with enough charcoal for its reduction to the steel to be melted. (a)

This method of improving steel has since

been introduced into the Bessemer process; but instead of adding manganese dioxide itself, an iron ore containing considerable manganese is used as the starting point. Nearly all the manganiferous ore imported is sent directly west to the Pittsburgh region, particularly to the Edgar Thompson Steel Works.

Since the greater quantity of imported manganese ore comes directly to Baltimore, and moreover, because of the convenience offered to Southern producers of selling ore through Baltimore agents, that city has come to be regarded as the headquarters of the manganese industry, although very little of the ore is actually consumed there.

(a) J. S. Jeans, "Steel, its History, Manufacture, Properties and Uses," 1880, p. 27.

Preparation of Ore for Assay.*

All ore assays must be finely powdered, but not the whole of a large sample need be so. A large sample is broken by hammer and block, pestle and mortar, etc., so that no one piece shall be a considerable fraction, say more than one-thousandth of the whole, then mixed on a suitable cloth or smooth table. The sample is then spread in a layer, and divided, by the back of a saw-blade, a trowel, or spatula, into quarters. Two opposite quarters are rejected and again mixed, after further pulverizing, if needful, and again divided. When reduced to a pound or so, the sample is passed through the coarser sieve, and now a sheet of strong paper or of oilcloth is suitable to mix on, by lifting an edge and drawing it forward so as to roll the sample upon itself, and to heap it in the middle; then again spreading by the spatula, and so several times. The sample is thus gradually reduced in quantity, being more finely ground step by step, until several ounces have passed through the finest sieve.

For mixing a sample, after it has reached a certain fineness, no implement is equal to the finger. Heap the ore, then, with the finger, beginning at the center of the heap, trace a spiral to the edge and back to the center. Again heap by lifting the edges of the sheet, and again spread by the finger, and so on.

Without perfect mixture at each stage of division, the final sample will not be a true one, and this final sample must again be mixed, in order that each assay taken from it may also be a true sample of the whole. An idea of what is required may be got by adding a little flour to a finely powdered sample of dark-colored ore, or charcoal to a light-colored one, and mixing until the tint is uniform without streaks or spots.

Each time that a sample is ground or sifted the whole of it must pass through a sieve unless there are particles of tough matter, such as metal, or silver-glance, etc., which cannot be ground to a powder. In this case the tough matter must be kept, and no further division of the sample can be made, as it must all be weighed and treated as directed further on.

Damp ore must be dried. In particular cases all samples, whether they appear damp or not, should be dried after being powdered, then allowed to cool before weighing the assay. Many substances, such as clay, for instance, lose more and more water at successive degrees of heat up to whiteness, wherefore there must be a standard temperature for the drying. That standard is the heat of boiling water; hence the sample is dried on the water bath.

All implements used in powdering and sifting must be cleaned, lest the sample be contaminated by some remains of a former one. In many cases simply wiping the mortar, etc., with a cloth will suffice, but after rich ore, the tools must be cleaned by grinding some barren quartz, sand, or glass. Sieves are cleaned by brushing and tapping.

The prepared sample is put in a sample pan with a tag on which is marked the number of the sample, and any other desired particulars, such as the general character of the ore, as a guide in dressing or the metal for which it is to be assayed, etc.

The character of the ore can, in general, be ascertained sufficiently and most conveniently by an examination of it in the lump before grinding. When this cannot be done, as in the case of samples which come already ground, recourse must be had to washing (panning) a little of the powder in a dish, by which the character and proportion of sulphurets may be judged, if there are any. The color and general appearance also furnish indications, or special tests may be applied, some of which are given further on.

*This extract is from a plain practical work on "Assaying," by Chas. H. Aaron, lately issued and for sale by Dewey & Co., S. F. Price \$1.

OCEAN STEAMERS.—The increase in the speed of ocean steamers has come to be a matter of great interest. The Alaska and the City of Rome have repeatedly crossed the Atlantic in less than seven days. There are several other vessels whose speed is but little less. Two new steamers are to be added next year which promise to reduce the time of the passage to less than six days.

MINERS' wages in Germany average from \$12 to \$15 per month. In Mexico they average \$18 and \$20 per month, and in Colorado they average from \$2 to \$4 a day—from \$90 to a \$120 per month. Miners wages in Nevada and Northern California are \$4 per day. In El Dorado and Placer counties they are from \$2 to \$3.50 a day.

MECHANICAL PROGRESS.

Heat Developed in Forging.

M. Tresca, of Paris, the well known French experimenter, recently presented to the French Academy of Sciences the results of some very interesting work on the development and distribution of heat produced by a blow from a steam hammer in the process of forging. M. Tresca, in carrying out his experiments, used a carefully polished bar and covered it on both sides with a thin layer of wax. It was then placed on an anvil and struck by a monkey of a known weight, P, falling from a height, H. The faces of the monkey and the anvil were exactly alike, and care was taken that the whole work—namely, P H—should be expended upon the bar. A single blow was sufficient to melt the wax over a certain zone, and this indicated clearly how much of the lateral faces had been raised by the shock to the temperature of melting wax.

As to the form of the zone of melting, it was found always to extend around the edges of the indent produced on the bar by the blow. On the sides of the bar the zone took the form of a sort of cross with curved arms, the latter being thinner and thicker according to the greater or less energy of the shock. With regard to the ratio between the heat developed and the energy of the blow, it was found to be much greater than had been expected when the other sources of loss were taken into account. In some cases this reached 80 per cent, and in a table given by M. Tresca the limits varied for an iron bar between 68.4 per cent with an energy of 288 foot-pounds, and 83.6 per cent with an energy of 648 foot-pounds. With copper the energy was found to be very nearly constant at 70 per cent. The proportion above referred to was less when the energy was less, and also diminished with the section of the bar, this being, no doubt, due to the fact that the heat in this case is conducted away more rapidly. On the whole, M. Tresca sums up his results as follows:

1. The development of heat depends on the form of the faces and the energy of the blow.

2. In the case of faces with sharp edges, the process described allows this heat to be clearly indicated.

3. The development of heat is greatest where the shearing of the material is greatest. This shearing is, therefore, the mechanical cause which produces the heating effect.

4. With a blow of sufficient energy and a bar of sufficient size, about 80 per cent of the energy re-appears in the heat.

5. The figures formed by the melted wax give a sort of diagram showing the distribution of the heat and the character of the deformation in the bar.

6. Where the energy is small the calculation of the percentage is not reliable.

So far we have spoken only of cases where the anvil and monkey have sharp faces. Where the faces are rounded the phenomena are somewhat different. Instead of commencing at the edges of the indent, the fusion begins near the middle, and appears in small triangular figures, which gradually increase in width and depth until at last they meet at the apex. The explanation is that with the rounded edges the compression at first takes place only in the outer layers so long as the blows are moderate in intensity.

New Method of Making Chrome Steel.

Mr. Arthur Armitage, of Sheffield, England, has invented a new process for the manufacture of chrome steel, which, he claims, gives rise to greater hardness, toughness and ductility than is ordinarily obtained. His method is to add from 1 to 2 per cent of chromium into the molten metal, either in the form of manganiferous chromisen, or chrome-spiegel, or in both such forms, the name given being dependent upon the quantity of silicon and graphite contained in the alloy, which in either case is to contain, in addition to the usual proportions of spiegel, 1 to 10 per cent of chromium. These alloys may be obtained by smelting in the blast furnaces mixtures of manganiferous iron ores and chrome iron ores together with lime and alumina compounds, so as to produce a highly basic slag, and thus prevent loss of chromium, an excess of manganese being also used to prevent the chromium slagging out. If the product be manganiferous chromisen—that is, an alloy containing a certain percentage of silicon and graphite—it is mixed with the requisite proportions of pig iron and melted, and the molten mixture converted into steel in the ordinary manner. The manganese present in the metal, it is anticipated, will prevent partially or totally the oxidation of the chromium during the conversion of the metal into steel. If the alloy obtained should contain such small proportions of silicon and graphite as will render it uninjurious if added directly to the metal when in its molten state in the converter furnace or ladle, then the alloy may be used alone or mixed with ferromanganese or spiegel, either in the solid state or run into the converter furnace or ladle after melting, and whether or not chromium has already been introduced into the metal by the use of manganiferous chromisen or otherwise, by this process oxidation will be avoided, and the whole or greater portion of

the total chromium contained in the chrome spiegel will be found in the steel.

IMPROVED WIRE-ROPE ATTACHMENTS.—A simple but very useful invention has lately been brought out in England which may ultimately come into considerable use among miners. The invention consists in an improved method of fastening together wire rope. An old form of fastening was the use of conical thimbles in which, after the end of the rope was inserted, the diameter was conically increased by bending the wires, by driving spikes into the core of the rope, or by casting hot metal round it; in other cases the ropes have been pressed together by bolts and nuts, eccentrics, levers, etc. All these arrangements allow a more or less axial strain to take place, and have the defect of weakening the rope chiefly, and in the greatest degree, at the entrance to the thimble; and, therefore, some of the wires at this place are quickly destroyed, nipped off, or worn through successively. Also in the old modes of splicing, etc., the success depends on the skill of the workman, and even when most skillfully performed the rope suffers a great deal, because through untwisting and otherwise dealing with the rope the positions of the wires and strands to each other are altered, and, therefore, the attachment of the same becomes unequal. Casting hot metal round the rope has the defect of altering the nature of the material. The method of fixing is extremely simple. The end of the rope is pushed into the thimble from the lower part; then on each side of the thimble a wedge is inserted from the top end, and driven in by a few blows with a hammer; the further tightening then ensues in a self-acting manner, as soon as the load is put on the rope. In order to keep the wedges in their proper place, a cotter pin is pushed through a hole at the side of the thimble. When wishing to loosen or detach the rope, a few blows on the loop of the thimble will suffice to make the wedges come up. It is claimed that these improved rope attachments are equally well adapted for metallic or hemp ropes, as well as for flat and round mining ropes, and for tension bars in roof constructions they have proved very efficient.

TEACHING RUSSIA TO MAKE ARMOR PLATES. Sheffield has taught France and Germany how to compete with England in the making of armor plates. She is about to do the like in respect of Russia. Messrs Charles Cammell & Co. have completed with the Czar's government a contract to manage the new works at Kolpino, near St. Petersburg, where what is commonly known as "ship plates" of both iron and steel will in the first place be manufactured. From a patriotic point of view, the action of the English house is somewhat severely criticised; but "limited liability companies" do not usually lay claim to patriotism as one of their assets. From a business point of view the Russian rolling contract looks like the history of the "goose and the golden eggs" repeating itself. But outsiders are not competent critics, and it may be that the armor plate monopoly shows signs of cracking, and that Messrs. Cammell think it better to roll plates for hire rather than not roll at all. Even after a five years apprenticeship under Messrs. Charles Cammell & Co., it is very problematical whether the Russian will be able to produce armor plates at Sheffield prices; but whatever the cost, the Kolpino mills will probably execute all the Russian government work.

A NEW AND ECONOMICAL BELTING.—A foreign exchange reports that the latest patent in bands used for machinery is one for an invention by which it is claimed the only good belt made of textile fabric can be produced. It is not affected by change of temperature, stretches very little, is thoroughly waterproof, is as durable as leather, and being without the objectionable joints and splittings of a leather belt, it runs straighter and truer. The belt is made solely of the best Russian flax, and in price is from 25 to 60 per cent cheaper than leather belting. The unusual strength of the belting results from its being folded somewhat peculiarly, and which also accounts for its stretching so little. It is rendered waterproof by an entirely new process known only to the Russian government, the peculiarity of which process gives it a marvelous grip of the pulley, and, no matter how long it is used, this never leaves it. The flax belt has been in use in Russia for more than two years and a half, and it has given the greatest satisfaction.

AMERICAN CUTLERY.—A correspondent of a London paper, in a recent issue, says: "About the only advantage English cutlery can claim over American competitors is that which attaches to the traditional reputation. It is a mistaken notion that the former have an advantage over the latter in the matter of steel. American steel made for cutlery and tool purposes is as good as any steel made in Great Britain, and it would be folly to question the fact. The art of steel-making has been brought to great perfection in Pittsburgh; and while it is true that some old houses consuming steel prefer and use the English, it is as much because they are unwilling to make any change in material and methods as because they consider English steel really better." While thus admitting the excellence of our material, this writer says that in "finish" our best specimens of cutlery are certainly unsurpassed by the choicest goods of Sheffield.

SCIENTIFIC PROGRESS.

Interesting Experiments with Hot Gases.

In November last, Dr. Werner Siemens presented to the Berlin Academy of Sciences a paper from which it appears that gases heated to a temperature at which steel begins to melt do not emit any luminous rays, if proper care has been taken to subject them only to heating and not to chemical action. Dr. W. Hittorf, of Muenster, has since then recalled the fact that he made observations of this kind in 1879. When causing the electric spark, produced by the 1,600 cells of his battery, to pass between two platinum electrodes, he noticed the positive terminal surrounded by a yellow red light and the negative by a blue glow, but the rarefied gas between the terminals was quite dark, although hot enough to melt any metal rod held in it.

Dr. Siemens' investigations induced Dr. Hittorf to repeat his experiments, employing two iridium bars (of equilateral section with a side of three millimeters and six centimeters long) from the well known platinum works of Mr. Matthiew. These iridium electrodes Dr. Hittorf fixed in strong brass rods, and placed them opposite one another in a glass tube of six centimeters length. By arranging his powerful battery of 2,000 cells in groups so as to decrease the interior resistance, Dr. Hittorf obtained most beautiful and curious effects, the anode melting, and the cathode maintaining its sharp edges; both, however, at white heat, while the gases—nitrogen, hydrogen, and carbonic acid—were experimented with—remained perfectly dark.

From these experiments it would follow that wherever a gas is perceived to be glowing, we have to deal with a combustion or other chemical combination, and not with heat effects only; and it has been established by Mr. G. Wiedemann, that the splendid luminous phenomena of the Geissler tubes are of the nature of a phosphorescence—that is to say, of a slow combustion. That only flames and not heated gases are luminous, may strikingly be proved by a very simple experiment. If a cylinder of very fine platinum foil is suspended in the hottest part of the flame of a Bunsen burner in a horizontal panel, and looked at from a distance through a narrow tube, the platinum cylinder will of course at once begin to glow, but the air within appears dark.

The earliest observation of this kind was probably made by Wedgwood, who as early as 1792 pointed out in the Philosophical Transactions that a current of air blown through a strongly heated clay tube bent in zigzag shape did not emit any light. But the fact appears to have become quite forgotten, although Melloni, the foremost investigator of his time in the field of radiation, clearly distinguished in this sense between heated gases and flames.

Peroxide of Lead as an Insulator.

Having had occasion for a year to apply, for the decoration of articles of jewelry, the procedures pointed out by Nobili and Becquerel for obtaining coloration by means of baths of alkaline plumbates and ferrates, I observed that the articles thus colored became absolutely proof against all galvanic action; that is, their surface when once coated with peroxide of lead or of iron were insulated, and no longer conducted the electric current. A wire of copper, brass, or even iron, may thus be coated with an insulating layer like a stratum of resin or gutta-percha.

This principle, I believe, admits of easy utilization in preparing wires and cables for use in telephony and telegraphy.

The method of obtaining this insulating stratum is, from an industrial point of view, very practicable, and the cost trifling. The hardness of this coating, which resists all atmospheric action, is a guarantee of its durability. The insulation is absolute.

The method of preparation is very simple. A bath of plumbate of potash is prepared by dissolving 10 parts of litharge in 1,000 parts of water, to which have been added 200 parts of caustic potash, and boiled for about half an hour. It is allowed to settle, decanted, and is then ready for use. The wire to be coated with peroxide of lead is attached to the positive pole, and a small platinum anode to the negative. Finely divided metallic lead is precipitated upon the negative pole, and the wire is coated with peroxide of lead, which passes successively through all the colors of the spectrum. The insulation is complete when it takes a brownish black color.

The wire thus covered is perfectly insensible to electric action. Articles perfectly cleaned may be attached to it, and connected with the negative pole of a gilding, silvering or nickeling bath without the current, however powerful, producing any action upon the objects to be coated. Such a wire, if placed in a circuit, and brought in contact with another wire in connection with a galvanometer, leaves the latter entirely unaffected.—*M. C. Widemann, in Comptes Rendus.*

VOLCANIC ASH—WHAT IT IS AND HOW PRODUCED.—Every careful reader has read much of volcanic ash; but there are many who have

very little idea of what it is or how it is produced, only that it is ejected from volcanoes. Whenever a volcano is in active eruption, red-hot lava, in masses of many tons' weight down to the size of small pebbles, are thrown upward with great violence. These pieces, in their descent, encounter other pieces in their upward flight, and by thus crashing together many of the flying pieces are broken and much of the mass is reduced to impalpable dust, the latter of which is borne away by the wind and spread broadcast over the country, often for hundreds of miles distant. At the great eruption of Tomboro, on the island of Sumbawa (east of Java), which continued from April 5, 1815, to the beginning of June, some of the dust thus formed traveled to Tara and Celebes, a distance of 300 miles, and caused a darkness described by Sir Stamford Raffles as more profound than that of the darkest night. This dust was deposited over an area estimated at about two thousand miles in circumference, and in some places was so deep as to do serious mischief. This, of course, is an extreme instance, but during ordinary eruptions a deposit of some inches in depth is spread over vast areas, supplying a "top dressing" that our farmers would envy, and which would put an end to the artificial fertilizer trade if we were within reach of such volcanic beneficence. By an analysis made by L. Ricciardi of ashes ejected from Vesuvius on February 25th, 1882, he found in them four and one-third per cent of phosphate of lime and more than five and one-half per cent of potash, and the ash evolved a sensible quantity of ammonia when treated with caustic potash. These and other constituents indicate a valuable fertilizer.

Decomposition of Feldspar by Humus.

A Russian named Meschtschersky has been experimenting upon the decomposition of common feldspar by humus both in the laboratory and in the garden. Finely ground orthoclase was sealed up in a glass tube with humus and water and heated for nine or twelve hours daily to 115 degrees C. (239 degrees F.), for one or two months; he then filtered the contents of the tube and examined both residue and filtrate. Another experiment was conducted under ordinary conditions, the orthoclase and humus being placed in a tin box with double bottom and buried in a garden for six months.

In both cases the orthoclase was decomposed. The composition of the feldspar employed was as follows: Silica, 62.02; alumina and oxide of iron, 23.93; lime, 0.25; potash, 7.21; soda, 4.39.

The humus was obtained by the action of sulphuric acid upon racemic acid. When washed and dried at 120 degrees C. it consisted of 57.17 per cent carbon, 4.59 hydrogen, 37.96 oxygen, and 0.28 ash.

He draws the following conclusions from his experiments: 1. Orthoclase is decomposed by humus in the presence of water, giving up its constituents to the humus and taking up water. The separation of silica, alumina and soda are the easiest, that of potash the hardest. Hence there is an essential difference between this decomposition of orthoclase and weathering. 2. The humus is partially decomposed into carbonic acid and water, and partially converted into soluble and insoluble mineral compounds of humus. 3. The decomposition is directly proportional to the time and temperature.

SERPENT VENOM.—The destruction of human life by the bites of poisonous serpents is so great in many countries, that it becomes really an important problem to ascertain the amount of damage, and to seek the remedy. Dr. Robert Fletcher has brought together much information, in a paper read before the Washington Philosophical Society in May last. Sir Joseph Payrer states the average mortality from serpent bites in India to be fully 20,000 annually. In 1869 the returns were obtained through official sources, from a large part of India, with unusual care and accuracy. In a population of nearly 121,000,000, representing an area of less than half the peninsula of Hindustan, the deaths were 11,416, or nearly one in 10,000. Of these deaths, there were caused by the cobra, 2,690; krait (Bungarus ceruleus) 359; other snakes, 839; unknown snakes, 6,922; no details, 606; total of 11,416. In 1880, 212,776 poisonous snakes were killed and paid for in British India; and in 1881, 254,968. Even in Europe and in this country, the number of accidents from snake-bite is very large. In one department of France, La Haute-Marne, the government paid, in six years, for the destruction of 17,415 vipers.

PLANT DEVELOPMENT IN HIGH LATITUDES.—A Norwegian plant geographer, Professor Schubeler, called attention a short time ago to the remarkable fact that most plants in high latitudes produce much larger and heavier seeds than in warmer regions near the equator—an effect which he ascribes to a prolonged influence of sunlight during the long summer days of the high latitudes. In some cases the dwarf beans taken from Christiania to Drontheim, less than four degrees further north—gained more than sixty per cent in weight, and thyme from Lyons, when planted in Drontheim, showed a gain of seventy-one per cent. The leaves also of most plants are larger and more deeply colored in higher latitudes, as was first noticed by Griesbach and Martins. The same is true of flowers, and many which are white in southern climates become violet in the north.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

RICH STRIKE.—*Dispatch*, Dec. 22: A body of very rich rock was struck last Tuesday in the St. Julien mine, on Murphy's Ridge, owned by Moore, Conlon, Price, Caminetti & Co. The full extent of the body is not yet known, but the specimens of rock taken out show a large amount of sulphuric acid and a considerable quantity of free gold. The mine is located near the celebrated Nevills mine, and there is every indication that the strike will prove to be a very valuable one. The proprietors feel highly elated over their prospects.

ST. JULIEN.—The *Ledger* of same date says of the strike and of the mine: This quartz mine is situated near Middle Bar, on the main mineral belt. It adjoins the Mammoth claim on the south. It has been bonded to Messrs. George Moore, A. Caminetti, J. R. Price and Thos. Conlon. The work done upon it lately consists in running a tunnel into the side hill in a northerly direction. The tunnel has reached a distance of 115 ft. and about 40 ft. from the surface. Last Tuesday morning quartz was struck on the footwall. How extensive the strike remains to be seen. The find is important on account of its proximity to the famous Mammoth mine. The strike is 400 feet from the boundary line of the Mammoth ground. The big tunnel will explore the Julien ground at a depth of 800 ft. from the surface. Since the above was written further prospecting proves that a pocket has been stumbled upon. The owners brought up Thursday evening three sacks of ore, composed mainly of arsenical sulphurets, iron and gold, mixed with quartz. The ore is very heavy, a small sack being as much as a man can lift. It is of a black color, and when burnt shows considerable gold. Altogether it is of the same general character as that met with in the famous Mammoth pocket, except, perhaps, that it does not carry so large a percentage of gold. As far as explored, the ore body is from six inches to a foot in width. It widens as it is followed deeper. The discovery has created quite a stir in the vicinity.

LINCOLN.—S. D. R. Stewart, who has leased this property, proposes to start work immediately. The intention is to clean out and sink an old shaft east of the present shaft, and near the Iowa line. The pocket lately taken from the Iowa encourages hope.

NOTES.—It is reported that the Wildman mine, Sutter Creek, has changed hands, the purchasers being San Francisco capitalists. Some fine specimens of sulphurets were brought to Jackson Tuesday, by a Mexican, the place of discovery being in the vicinity of Clinton. The big tunnel at Middle Bar is now in a distance of 300 ft. The best prospect for a big mine in Hunt's gulch is reported to be at Doyle's claim. It continues to develop splendidly.

THE STRIKE.—*Sentinel*, Dec. 19: The full extent of the strike has not been ascertained, but in expectation the owners are trembling with excitement as visions of becoming Mackays and Floods float before their disordered sight.

Frank Guerra, who is working on the Morgan claim in Hunt's gulch, is reported to have made a rich strike. The Bartlett brothers are waiting for time to run their gravel mine at Slabtown. The Tripp and Littlefield mine near the Big Bar bridge has again been started up, and is working six men.

Calaveras.

MAMMOTH EXTENSIONS.—*Chronicle*, Dec. 29: In republishing an account of the "find" recently made in the St. Julien, which mine is situated only 3 miles from this town, but on the Amador side of the Mokelumne river, it is well enough for us to state that several well developed ledges have been discovered and located on the Calaveras side of the river of late, all of which seem to be extensions of the ledge of the celebrated Mammoth mine. San Francisco capital has taken hold of some of the properties on this side, and we feel safe in saying that Calaveras, as well as Amador, will soon have a boom in quartz.

CARSON HILL.—The new mill being erected by Wm. Irvine, at Carson Hill, is about completed and will soon be crushing quartz. The Melones mill—40 stamps—is running day and night. There is a hotel, two saloons and a great number of dwelling houses at Carson Hill at the present time.

Mariposa.

THE MOTHER LODE.—*Mariposa Gazette*, Dec. 29: The value of the great mother lode which runs through Mariposa, Tuolumne, Calaveras, Amador and other counties, is just beginning to be realized. Although the mother lode has been profitably mined in Amador county for many years, mining on it in Tuolumne and Calaveras has, until recently, been of an unsuccessful character. Of late years mining men have begun to understand what difficulties are to be encountered, and what is necessary to overcome them. As a consequence, the importance of the vast deposits of low grade quartz in the mother lode is now forcing itself upon the notice of the mining public. At Angels Camp, in Calaveras county, the mother lode is mined and milled at an expense of \$1 per ton, and one Supt. says he is going to reduce the expense to sixty cents per ton. As the lode is over 100 ft wide, and yields about \$4 to the ton, it is easy to see what a bonanza it is. In this county there are many places where the great lead could be successfully worked if capital, experience and a thorough knowledge could be brought to bear.

Mono.

MAY LUNDY.—*Honor Index*, Dec. 29: The May Lundy is being worked with the usual force, and the tramway has not yet been obstructed by snow, though on account of the drifting of the snow in the upper canyon teams have not been hauling ore this week. The mill is kept going steadily day and night, and the bullion shipments are regular.

NEPTUNE NO. 2.—J. R. Crane has completed arrangements to increase the working force on Neptune No. 2, Jordan district, as soon as the holidays are over. The surface cut last summer revealed a large ledge and some very rich ore.

CLIFTON.—The Clifton mine, on the north slope of Mount Scowden, just above Lundy, is rapidly coming to the front. About half way from the entrance

to the header of the old tunnel an incline winze is being sunk, and, from about three ft. in width at the tunnel floor, the fissure has expanded to six ft. seven inches in sinking ten ft. Vein matter fills the entire space between the walls, with three strata, each fully one ft. in thickness, of very rich ore.

Placer.

FOREST HILL.—*Placer Herald*, Dec. 29: The Mayflower M. Co. started up their new 10 stamp mill last Saturday. It is working splendidly. The Breece & Wheeler diggings are taking out some fine gravel, some of it yielding as high as \$10 to the pan, but the gravel is getting lower than the tunnel thus making it more difficult to take out. The Washington Co. is getting its buildings ready for the new hoisting and pumping machinery which will soon be up. Taking it altogether the mining outlook on the divide is very favorable.

Plumas.

HALSTED MINE.—*Greenview Bulletin*, Dec. 26: On last Friday the face of the tunnel in the Halsted mine was within ten ft. of the ledge, according to survey. This ledge proves to be more extensive the more it is examined. From Rich gulch it can be traced entirely through the mountain ridge to the opposite side, on North Fork, a distance of five miles. In many places it crops out several ft. above the ground, and in other places it is covered by lava or other matter, but over this whole distance wherever sought for it can be found, and in all places has the same general character. For some time past Joe Halsted has been running an arastra on the ore at Rich gulch; last week he made a clean up after a run of three weeks, and found that the rock crushed in that time had averaged \$32.50 per ton. Should the ledge hold out at even half this value it would be the greatest mine in the State, when the supply of ore and facilities for working it are considered.

DEADWOOD.—Bob Bone has located a claim on the Rich gulch ledge at Deadwood, on the North Fork side of the ridge, and is at work there now.

San Bernardino.

ORO GRANDE.—*Los Angeles Herald*, Dec. 29: The Oro Grande Mining Co. has declared a monthly dividend of \$6,000, making a return to its stockholders of \$1,000 since the 1st of March last. The company has purchased the ten-stamp mill of the Oriental Company, of Calico, and will add five more stamps. The improvements will be completed in about forty days. The Oriental mill is but six miles from the mine, which will save a transportation of thirty miles on the ore. The leading stockholders in the Oro Grande Co. have also purchased a controlling interest in the Burning Moscow, which adjoins their great King mine, and will set to work to open it out in good style. This mine is now in able hands and will undoubtedly give a good account of itself. Secretary Johnson, of this city, will superintend the reduction of ore in the Oriental mill. The Oro Grande mill, with its fine water power, will probably be run on custom ore, unless the company conclude to develop the mines that lie near the mill.

MOHAVE DESERT.—The *Los Angeles Republican* has the following: Messrs. James Noel and George Turner, well known citizens of Los Angeles, have returned from a visit to a new mining camp in San Bernardino county. They bring with them some very rich specimens of ore and chloride of silver. The mines are situated upon the edge of the Mohave desert, about forty miles south of Calico, and 120 miles from Los Angeles. Mr. Noel, who is the president of a company incorporated for the purpose of working these mines, exhibited several specimens of ore from the Soledad and the Sanchez mines. That from the Sanchez vein was from a depth of more than one hundred feet, and is fully 50 per cent silver. The vein from which this specimen was brought is narrow, but is flanked by large quantities of ore of a lower grade, the richest ore running through it in streaks. The Soledad and Sanchez mines are being worked with imperfect facilities, but a large amount of ore is being accumulated in anticipation of the coming of a ten-stamp mill which has been ordered from the East.

Shasta.

EAST FORK.—*Democrat*, Dec. 26: Levi Day was in town last Monday and reported everything lovely at the East Fork quartz mine. The arastra is all ready to start up as soon as they have water. They have about 20 tons of rich rock at the arastra and a lot on the dump.

JUNCTION CITY.—The continued dry weather has demoralized the news department of this place, as there is nothing transpiring worthy of note. When we have plenty of rain and the miners get well at work, then we will have plenty of news. Notwithstanding the extremely dull times every one is cheerful and hopeful. For the last eight years we have not had water to mine with before the latter part of January.

"OLD DIGGINGS."—The *Redding Independent* of Dec. 28th credits the following to the Red Bluff *Tocsin*: G. W. Fleming has placed on our table samples of the quartz taken from his newly discovered gold quartz mine (the Texas) located in Old Diggings, Shasta county, Cal. The quartz when burned shows free gold to the naked eye. It assays \$75 to \$100 per ton. Mr. Fleming tells us that he has crushed about twelve tons of select ore which averaged about \$50. He has gone down 12 ft. The average width of the ledge is 3 ft, standing in solid casing. Much of the rock has free gold in it.

Sierra.

COLUMBO.—*Sierra Tribune*, Dec. 27: Last Thursday the whistle at the Columbo mill sent forth its first notes, telling the people of Sierra City and of the whole county that another great enterprise had sprung into life. The machinery ran like clockwork. The double-track tramway was also found to work satisfactorily upon being tested. It was expected to begin crushing ore Monday. The vast amount of work that has been accomplished in and around the mine during the past four or five months, and the manner in which it is done, proves conclusively that Supt. Deidesheimer is the right man in the right place.

RUBY MINE.—Everything was in readiness last week to put on a crew of 70 men as soon as water should come. H. Pichoir and H. C. Miller, stockholders in the mine, were up from San Francisco last week. They expressed themselves highly pleased with the present promise of the mine. Mr. Pichoir carried away 40½ ounces of bullion, the yield of 320 carloads of gravel taken out of the main tunnel. The

Co. have recently purchased from James McNaughton, of Forest City, and George Paterson, of Oakland, the City of Six mining claims and water right. The price paid was \$1,500. This gives the Ruby Co. exclusive rights to the water of Rook creek and possession of quite a large tract of mining ground.

SIERRA BUTTES.—No. 9 tunnel, at the Sierra Buttes mine, is being pushed ahead at the rate of 30 ft. per week. The rock is getting softer, requiring the tunnel to be closely timbered. The first ore body will be tapped in the neighborhood of 1,000 ft. further. A whistle has lately been added to the works at the lower tunnel. It is expected to have the new mill in operation next spring.

FOUR HILLS.—Eleven men are employed at the Four Hills mine at present. These are principally engaged in doing work. The mine is in a fine condition and a large body of rich ore is in sight. The mill will start up when water begins to flow. George Reynolds, Jr., was down from the mine this week.

Siskiyou.

CALLAHAN ITEMS.—*Yreka Union*, Dec. 20: The only claim working at present that we know of is Mitchell & Co. They are in good ground and have done well this season; the drier the season the better for them. There is some quartz excitement. Bob Small showed the writer a nice piece of quartz with an abundance of free gold in sight that he says assays \$2,000 to the ton and that they have several tons out that will go \$65 to the ton, and a ledge traced 1400 ft. on the surface, rich all the way. Chas. Hall returned lately from the Cariboo mine on south fork of Salmon, where he lately finished the erection of a quartz mill for Bennett, Abrams & Shultz. Their quartz prospects well.

IRON MOUNTAIN.—We are informed that a party of capitalists has formed an association for the purpose of working the ores of Iron Mountain, between Pitt and McCloud rivers. The company intend to erect large smelting works and manufacture steel rails. The smelting works will be erected at the junction of Pitt and McCloud rivers, from which place to the mine, a distance of 8 miles, they will build a narrow gauge railroad to convey the ore from the mine to the smelter. The erection of the smelting works and the building of the narrow gauge road will occasion the outlay of a large sum of money, and the company expects to have 1,000 men employed by the 1st of March.

Trinity.

IGO.—*Cor. Journal*, Dec. 29: The Hayward or Hardscrabble hydraulic mine has been fitted up in good shape and will commence yielding treasure as soon as the required amount of rain comes, which will be about the holidays or we are no prophet. Mr. J. W. George and the Hoskins Bros. have recently made a clean up of \$700 from 13 tons of ore from the Rattlesnake mine, Bullyhoop district.

NEW RIVER.—*Cor. Journal*, Dec. 29: The storm of the early part of October created a general stampede of quartz miners from here. Some have gone to San Francisco and others to Humboldt county to pass the winter. They will resume work in the spring. We have been informed that there will be one, and perhaps two, 5 stamp mills put up here next summer. Ladd, Clifford & Co. were the last to decamp. They carried with them 16 lbs. of amalgam, weight on the grocery scales at the new river store, from seven days' run of their arastra on ore from the Mountain Boomer ledge. The placer miners are waiting with their usual patience for the winter rains to set in.

Tuolumne.

RICH ROCK IN THE PATTERSON.—*Sonora Democrat*, Dec. 29: The Patterson mine at Tuttle town is developing wonderfully of late. In the bottom of the incline, at a depth of 650 ft, the ledge is more than 18 ft wide. The rock is richer than any ever struck in the mine before. Chunks as large as a water bucket come up fairly glistening with fine gold, while here and there through the rock are heavy pieces of coarse free gold. A good deal of the rock is impregnated with lead sulphurets, which are very rich. At no time in its history has the mine made such a splendid showing as it does to-day.

RAWHIDE.—Operations have been resumed in the O. K. mine at Rawhide under the superintendency of John Dart. Some very rich rock was taken from the O. K. in the past, and we may expect favorable developments in the future.

NOTES.—William G. Long has obtained the entire control of the Willietta mine, at Jacksonville, having purchased Thomas Whitto's interest. It is Mr. Long's intention to commence the work of development right away. A 20 stamp mill is to be erected on the mine as soon as practicable. M. Foot and B. Hunter are running a tunnel on the vein in the Blackhawk mine, at Groveland, and are taking out some good rock. They think the prospects excellent. George A. Koch, of the Riverside mine, has bonded ten mining properties on the Stanislaus river, near the Riverside, from Col. Caleb Dorsey, of Oakdale, and others for \$375,000. Frank Gross is in high feather over the prospects of the Washington mine near Groveland, of which he is part owner with Steve Thomas and others. The shaft is down 40 ft, with a large ledge of fine looking quartz in the bottom.

HUNTINGTON QUARTZ MILL.—In last week's *Press* appeared an item clipped from the *Sonora Democrat* which gave the inference that the shutting down of the Garibaldi mine was due to the non-success of the mill. The following letters show that this is incorrect and explain themselves:

Mr. F. A. Huntington, San Francisco—Dear Sir:—In reply to your inquiry concerning the alleged failure of the new Huntington crusher (*Sonora Democrat*, Dec. 15) used in the Garibaldi mine, I take pleasure in saying that the mill gave entire satisfaction. The mine not proving successful caused the works to be shut down, but it was in no sense the fault of the mill.

E. J. PARSONS, Supt.
GARIBALDI MINE,
Calaveras county, Dec. 17, 1883.

F. A. Huntington—Dear Sir:—In answer to your inquiry concerning the working of the five ft. "centrifugal pan mill" bought of you for the Garibaldi mine in Calaveras county, I take pleasure in saying it gives entire satisfaction in every respect; and I only regret that the mine does not warrant the purchase of more of them and the continued use of the one now in operation.

O. B. SMITH, Manager.

NEVADA.

Washoe District.

OPHIR.—*Enterprise*, Dec. 29: Are still extracting some ore from 150 level. Good progress is being made in the winze that is being sunk below the 150. At a proper depth this winze will be connected with the main shaft, which has been put in good repair down to the 500 level, when explorations for ore can be economically made.

YELLOW JACKET.—A limited amount of ore is being extracted. A full force of miners cannot be put to work until there is a full head of water in the Carson river, or until the machinery is connected with the steam power recently placed in the Brunswick mill.

SIERRA NEVADA.—The raise from the main north drift on the 2900 level is going up at the rate of about 16 ft per week. The ground is dry and favorable. On the 3100 level a northeast drift has been started, and is now out about 15 ft.

HALE AND NORCROSS.—The work of pumping out the winze below the 2700 level is about completed. It is nearly all dead water—water that flowed in at the time of the accident to the Cornish pump at the Combination shaft.

COMBINATION SHAFT.—The work of setting up the new hydraulic pump at the 2600 level is progressing favorably. When the pump has been put into successful operation sinking the main shaft to the 3000 level will be resumed.

GOULD AND CURRY.—The joint Best and Belcher winze below the 2500 level is going down at the usual rate of speed. The ground at the bottom is somewhat soft and wet, but, on the whole is not unfavorable.

UNION CON.—Good headway is being made in the main south drift on the 3100 level. It continues in vein porphyry. It will connect with the main north drift in about two months.

CROWN POINT.—Some ore is being extracted, but a full force of miners cannot be employed, owing to the limited capacity of the mills on the Carson river in the present low stage of water.

UTAH.—The north lateral drift on the 1750 level is being pushed along quite rapidly. It is now over 100 ft. Thus far the formation is favorable.

ALTA.—The 2150 level—the lowest in the mine—is drained, and is being put in repair preparatory to a resumption of active prospecting operations.

MEXICAN.—Are making good progress in the work of timbering up the main north drift on the 3100 level and putting in drain boxes.

BEST AND BELCHER.—Good headway is making in the work of sinking the joint Gould and Curry winze below the 2500 level.

UNION SHAFT.—Are still engaged in easing up behind the timbers and in making needed repairs to the 2300 station.

IMPERIAL.—The main west drift is now within a short distance of the upper levels, which it is intended to explore for ore.

CALIFORNIA.—Fair progress is making in the joint Con. Virginia winze now being sunk below the 2700 level.

CON. VIRGINIA.—The usual progress is being made in sinking the joint California below the 2700 level.

ANDES.—Prospecting continues at the usual points, and some low grade ore is being found.

SCORPION.—The usual progress is being made in the main west drift on the 500 level.

OVERMAN.—A small amount of ore is being taken out of the old upper levels.

BELCHER.—Some ore is still being extracted from the old upper levels.

Belmont District.

BELMONT MINE.—*Courier*, Dec. 22: They are still encountering rich ore in the south portion of the Belmont mine. The prospects in the 200 south level are improving as the work of development advances. All is looking well in the other portion of the mine. Following is the official report for the week: The three south stopes on 200 level are all looking well; ledge carrying from fifteen to three ft. of good ore. Ledge in north stope, same level shows six ft wide and widening rapidly. Stopes in South Tunnel yielding the usual amount of high grade ore.

NOTES.—C. B. Streiberger informs us that the new discovery made in the 2 G mine at Tybo is proving a valuable one. When he left that town the ledge measured thirteen ft in width, and the ore extracted from it is of excellent quality. The mill is running nicely, producing excellent bullion. Green Aldrich has started the Emerson mill and leaching works. He is now leaching ore from the 77 mine. Messrs. Bartell, Hall and Colligan are encountering some rich ore in their mine, north of town.

Bernice District.

LATEST.—*Silver State*, Dec. 22: W. A. Van Reed who arrived at Reno a few days ago from Bernice district tells the *Journal* the following: It is situated in the southeastern part of Humboldt county, and about half way between Lovelocks and Austin. About fifty miners have been at work in the district for the past two years, and have developed a number of good mines—the Golden Crown, Wild Goose and White & Gilbert being among the best. The owners of the White & Gilbert have been shipping ore to Salt Lake for the past year, realizing \$206 per ton. G. W. Bothwell built a small custom mill in the district last spring, and found no trouble in keeping it at work on good ore all summer, and it was only shut down a few days ago in consequence of a scarcity of water. Work in the mines will be continued all winter in order to have a good supply of ore on hand when the spring opens.

Candelaria District.

COLUMBUS CON.—*True Fissure*, Dec. 29: During the past week good work was done in all the important points in the mine. The third level station was completed and the work of running a drift from that point towards the location of the Bonanza winze is now under way. The drift from the location of the Bonanza winze has attained a length of 65 ft; the face is now in good working ground which gives good assays. Since the last report the south cross-cut from the 150 level was extended 15 ft, making a total length of 45 ft.

MOUNT DIABLO.—The east drift from lower winze No. 2 is in 82 ft and shows a few inches of \$604 quartz.

Winze No. 5 is down 30 ft and shows a small amount of ore. The south crosscut from the west drift on third level is in 40 ft. A bullion shipment amounting to \$8,586.70 was made on the 24th instant.

THE FIRE.—The fire of Dec. 15th at Candelaria destroyed sixteen buildings. Nearly all the south side of Main street is in ruins, except the Esmeralda County Bank, which is fire proof. The losses foot up to nearly \$100,000; insurance \$30,000. R. K. Gamble & Co. and H. G. Smith are the heaviest losers. A scarcity of water was the cause of the fire spreading. This disaster, following on the closing down of the Northern Belle mine, has cast a gloom over the town.

Esmeralda District

MOUNT CORY.—Hawthorne Herald, Dec. 22: "The result of this outlay of time, labor and coin, warranted the Mount Cory Co. to construct reduction works on a gigantic scale at a cost of hundreds of thousands of dollars which will be in operation inside of two months. The successful working of their ores to a high percentage of the assays, same having been tested at the Geddies Bertu and works, Eureka, leaves no fears for a failure. The pay-roll at the Mount Cory reduction works last pay day footed up nearly \$32,000.

LURING.—Mr. J. R. Benton has a force of men working upon his mines. He expects to make another heavy shipment soon. Messrs. Baecigalopi & Sheller have a carload of very rich ore here, awaiting shipment. It is from the Stone Cabin vein and will go for more than 30 per cent. Mr. Murray and party are taking out considerable first-class ore at the Dumbarton Springs. They make a shipment this week. The hills are alive with assessment workers and prospectors, and people throughout the entire range feel encouraged.

Eureka District.

ENTERPRISE.—Sentinel, Dec. 27: The Enterprise mine, Foreman Williams tells us, is looking better as developments advance. The ore body is a ledge varying from 4 to 6 ft in width, with one wall exposed, the upper, the hanging wall, being removed by a back ledge recently discovered. The ore being taken out is galena and reddish carbonates, some of which is high grade. Mr. Williams says the furnace is working to a charm, and that the average value of the bullion reduced is \$150 per ton. The total expense involved is something less than \$120 per ton, so that there is a clear margin of \$30 profit per ton left. There are 23 men at work on day's pay, and more men are to be put on at once. There are about 40 men altogether in the camp employed by the Enterprise Company.

BALD MOUNTAIN.—Luther Clarke and his partners have a claim in Bald Mountain district that bids fair to make them all rich. In the claim referred to they are down 18 ft in overall the way. The width of the deposit is not yet known, as the find is of recent date. The ore is soft and reddish, and a number of specimens taken from the top of the workings to the bottom assay from \$123 to \$396. Work has been going on right along, but nothing has been heard from the mine in the last week.

Oseola District.

VERDI.—Cor. Southern Utah Times, Dec. 18: The Verdi mine, owned by D. Akey & Co. is bonded to a San Francisco company. The mine is situated about three miles south of the town of Oseola, and is one of the richest mines in the district. The ledge is stripped and opened with cuts and drifts for a distance of 400 ft, showing very rich free gold quartz. They also have a shaft sunk 60 ft, showing the same character of ore. They have about 20 tons of first-class ore sacked that will go up in the hundreds. They have also a large amount of second-class ore on their several dumps ready for milling. This mine is well situated for working advantageously. The ledge can be cut to a depth of 500 ft by a tunnel not to exceed 650 ft in length. The owners of this property also have a water right that affords sufficient water for 20 to 40 stamps.

THE OSEOLA MINE.—The Ward Reflex says: While in Oseola, A. B. Treece and Samuel Liddle went through the Oseola mill, which had been running some six or eight days at the time of their visit. They report that 35 tons of ore per day have been put through the mill since it started, and there is a good showing of amalgam, and that Mr. Turner, a Bodie millman, who is in charge, says that the result to date comes up to expectations. Ore is at present being put through the mill from all portions of the mine, which has been developed all along the line.

Revielle District.

MANHATTAN.—Grass Valley Union, Dec. 30: Although the Manhattan mines have been working continuously for 20 years, and have produced \$20,000,000, they are still quite shallow, the deepest not being over 1200 ft. The smallness of the ledges cause this. The ore is very rebellious and it is very expensive to work. It costs \$35 per ton to reduce the ores taken from their best mines, and these are the easiest worked of any found in the canyon of the Toiyabe range. The hills are full of ledges which will assay \$50 or \$60, but it will not pay to work them, for by the time they pay for mining, milling and the twenty per cent discount on silver, there will be nothing left. What is wanted is a process that will work this ore at \$4 or \$5 per ton. The discovery of such a process could make money faster than a Bonanza King by charging a small royalty on each ton worked. The Manhattan mines give good promise of permanency, for at the bottom of the deepest mine they have found as rich rock and as fine a looking ledge as they have ever had. This is very encouraging to the people there whose only hope is the Manhattan. If it fails there is nothing left. There are many Grass Valleyans there, as there are in every camp on the coast. Austin's altitude is 6,500 ft above the sea level.

ARIZONA.

UNITED VERDE CO.—Prescott Courier, Dec. 21: Mr. Thomas, the superintendent, commenced smelting some time in August last, and will, by January 1, 1884, have smelted 5,000 tons of ore and made 1,000 tons of copper bullion and copper cake, worth in the neighborhood of \$300,000. The smelter runs out every 24 hours from 10 to 12 tons of copper. Mr. Thomas once tried to see how much he could run out in 24 hours, and succeeded in getting 15 tons, less one pig of 500 lbs. This was wonderful for a 30-ton furnace. It is now yielding about \$3,000 a day, more than one-half of which is clear gain, over

and above expenses of every kind. Seven hundred mules and ever so many wagons are employed in hauling ore, coke, etc., and the number of men in the company's employ is about 120.

CONTENTION.—Tombstone Epitaph, Dec. 23: The pumps are running with the utmost regularity, keeping up a speed of three strokes to the minute, which could be increased if necessary more than double. The main three compartment shaft is being sunk as rapidly as possible. While sinking is pursued work in the stopes and levels is by no means neglected, and the usual amount of ore is extracted. The ledge in the bottom of the shaft is holding its own splendidly.

MAMMOTH.—From the 220 level a winze is being sunk. The same tapped a few days since a large ore body contained in a cross ledge. It has been traced from the surface, but only lately has developed into a large body, promising to equal if not to surpass the main ledge running north and south. Most work done on this mine has been development work. Since last March, at which time the present owners purchased this mine, the bullion production has averaged \$30,000 per month.

SILVER KING.—Pinal Drill, Dec. 22: The King Co. has paid in dividends \$1,300,000 and the stock stands at 57 1/2. Capital stock 100,000 shares. Now there are 100 men employed in the mine; they have just finished their new spacious changehouse and also a beautiful, cozy little mess house for the officers.

THE QUIJOTOS.—The Virginia Enterprise of the 28th of Dec. quotes from the Florence Enterprise as follows: The rush toward the Quijotos company has commenced. A prospecting party from Pinal and Silver King, consisting of John McCoy, Pat Donahue, Buck M. Dowell, W. Harris, Joe Baker, D. L. Beesley and Mr. Lewis, passed through here Wednesday en route to the new El Dorado. They had a 4-mule team, a wall tent 14x16, a complete outfit of mining tools and camp utensils, and enough provisions to last them two months. Several other small parties from other sections and bound for the same destination passed through here this week.

COLORADO.

THE WHITLOW LODGE.—Idaho Springs News, Dec. 21: The vein matter, already tested, is five ft wide, a cord of which run over the tables of the Golden Leaf mill by Dr. Barber, gave \$60 dollars. Even at the low figure of \$60 per cord, there is an immense fortune to be made by the owners of this property working it with a small stamp mill of their own or two batteries. On such a mill two cords of mill dirt could be crushed every twenty-four hours, making \$120 per day. The mill dirt could be mined by eight men, working day and night shifts on a five ft vein like the Whitlow.

MENDOTA.—Georgetown Courier, Dec. 22: Shay & Co., during the past week shipped two carloads (28 tons) of Mendota ore to Messrs. Mathews & Webb, from which returns have not yet been received. Mr. Shay tells us, however, that it is the best ore ever extracted from the mine. It was taken from two small stopes, one in the east and one in the west drift, about 70 ft below surface.

NEVADAVILLE.—Register-Call, Dec. 21: The Hubert mine is now giving a daily output of ore—mill or stamp dirt—which gives employment to 15 stamps. In the 900 level workings of the Kansas mine, worked under the management of the Denver Mining Co., the ore treated under the stamps has an average of nearly six ounces gold per cord.

COLUMBIAN MOUNTAIN.—Georgetown Courier, Dec. 20: On the Joe Reynolds, Farris & Co., lessees, have commenced sinking from the lower workings of No. 1 500 ft from the surface. They have 14 inches of solid ore. In sinking the first four and a half ft, 110 sacks of ore were taken out. Twenty-nine men are at work on the properties, all of whom are in good ore excepting one set of lessees, who are developing for a known body of good ore. The Reynolds properties, without doubt, have more ore in sight than any other property in the county.

LITTLE EMMA.—A mill-run of ore last week returned for 1st class, 1195 ounces silver per ton, and 2d class, 300 ounces. The Little Emma is one of the group of mines in its vicinity that produces the highest average value of ore per ton of any in Clear Creek county.

IDAHO.

MINERAL DISTRICT.—World, Dec. 21: The Daniel Boone mine at Mineral has been bonded for six months for \$20,000. The tunnel will be run in 200 ft to tap the ore body 400 ft deep. Times are quite lively at Mineral. Peck and Jones, on the Kit Carson, are getting the same kind of ore as the Black Maria, with the tunnel in about 40 ft. John Morris, on the True Blue, is getting good-looking rock, in 30 ft. There will be a number of large sales made in the camp within 30 days.

QUARTZBURG.—A cross-cut is being run from the 400 level of the Gold Hill mine, Quartzburg, for the Pioneer ledge. The cross-cut is now, it is thought, within 50 or 100 ft of the Pioneer. These two ledges are 140 ft apart at the surface, and according to an estimate based on the angles of the dips of the veins, the Pioneer will be reached with cross-cut from 400 level of Gold Hill, between 400 and 500 ft in length. The former has not been worked below the depth of 30 ft. It paid well at the surface—turned out \$160,000. It is owned by the Gold Hill Co.

ELKHORN.—World, Dec. 18: Hugh Turner is working eight men in the Elkhorn mine. They are prospecting for a pay chute some distance west of the old works. Hugh says they will probably not take out any rock before spring. Will put in the winter prospecting.

MINNIE MOORE.—A winze has been sunk from the 150 level of the Minnie Moore to a depth of 30 ft. At the bottom of it a 6 ft body of galena has been encountered. Up to November 1st work had been done entirely above this level. The mine is shipping now, and will continue to do so all winter, 12 tons of ore daily.

DEER CREEK.—Wood River Times, Dec. 19: About 150 men are at work on Deer creek this winter at the several mines, and a great deal of development work will be done. Many claims are being worked that would have closed down a month

ago but for the continued fine weather which has given them a chance to put up winter quarters. The Montann, Davitt, Keystone, Snow-Fly, Mount View, Emery, We-met-by-chance, Sunday Night, and several others, will work a force all winter. The Davitt Co. has the lumber on the ground for the hoisting works, and the buildings will soon be finished. The output of ore still continues large at the Narrow Gauges.

VIENNA MINES.—Ketchum Keystone, Dec. 19: Tom Tague has three teams at work hauling from 35 to 47 tons of ore per day from the Vienna and Mountain King mines to the mill. Four hundred tons are now in the ore house and 1,300 will be there by March 1st. Seventy-five men are employed in the Vienna mine, thirty-five in the Mountain King, and thirty-five at the mill. A tunnel has been started 400 ft below the old works of the Vienna to tap the vein 400 or 500 below the surface. Six men are at work running a tunnel to tap the Lion and develop it. The Vienna mill is gaining a bar a day, and the Co. is storing the odd ones, which will be shipped on a special. Five extra ones are now on hand. From 23 to 26 tons of ore is milled per day. It is of an extra high grade.

BULLION MINES.—World, Dec. 22: Fifteen men have been discharged from the Idahoan mine, leaving the force at fourteen. The night shift has been dispensed with, and the concentrators stopped. The mine is looking fine, and on the 200 level they have twenty inches of high-grade ore. Up to the time of cutting down the force, from 50 to 60 tons of ore were extracted daily. Twenty-six men are at work in the Bullion. The Mayflower is working 60 men, but will discharge some in a few days. Work on the Jay Gould has been entirely suspended.

CEUR D'ALENE.—Cor. of Eureka Sentinel, Dec. 27: As I am an old reader of your valuable paper I will give you my opinion of this camp. To begin with, it is the richest thing I ever saw. I have taken in all the mining camps on the coast. There are only three or four claims open as yet. In what is called the Willow claim, they clean up from \$100 to \$175 per day with eight men at work. There are two miners in the gang; the rest are hay pitchers. The other claims make about \$5 or \$10 per day. Now the bed-rock is frozen so hard that they don't get one-half of the gold. It beats anything I ever saw. All the hills around will run from 20 cents up, to the pan. Five hundred ft above the creek the best claims, so far, are on Pritchard creek. It is located for twenty miles. They are hunting quartz on snowshoes now. Every day turns up something new. A lot of Leadville mining men came in lately. After looking the mines over they laid out a town for over one mile in length. They say there will be over 20,000 people here by June. Town lots have jumped from \$25 to \$500 in two weeks. I don't think there are over 500 men, all told, in the district. We had a heavy snowstorm, which drove out all the men that did not have supplies to go on. Over 100 houses and cabins went up in the last two weeks, and the axes and whipsaws are ringing in every direction. Freight is \$20 per 100 pounds. For 40 miles the river is full of boats frozen in with goods—mostly whiskey.

The World, of 18th, credits the following to the Nez Perce News: T. M. Davis, of Farmington, who recently came from the Ceur d'Alene mines, says on his way out he met 75 Montana miners going in, and that 500 miners from Montana are expected to winter in Eagle City. The total population of the mines during the winter will be over 700 men. Very few persons are selling their claims, although opportunities to do so are not lacking. Although large quantities of provisions are being packed into the mines, Mr. Davis thinks food will be short before spring. All of the packing is being done by Indians who receive seven cents a pound for all the freight they carry over the trail. One Indian company has over 100 ponies engaged in packing. Oats are worth ten cents per pound on the Mullen road.

"THE WIDOW'S CLAIM."—Inter-Mountain, Dec. 23: "The Widow's Claim, so called, was located by the discoverer of the diggings for the woman who staked Pritchard in his explorations. The claim was jumped by a party of men, and out of it has come a good part of the gold thus far washed from the gulch. The widow (whose name is Mrs. Edgington) proposes next season to make a fight for the recovery of the ground. She hails from Virginia City, Nevada."

LATEST.—Virginia City Enterprise, Dec. 23: John McKay, just come in to Butte, Montana, from Ceur d'Alene, reports the trail broken into the mines from Rathdrum, and that four pack trains have gone in there since the 1st instant. About 75 men will winter there. Mr. McKay is very much elated over the gold and silver quartz discoveries, but echoes the suggestions of others that no one should attempt to go to the mines before spring. He also says that the miners will not allow a Chinaman in the district.

MONTANA.

FISH CREEK.—Helena Independent, Dec. 20: A few days ago we made mention of the reported discovery of rich placer diggings having been found on Fish creek, about 20 miles from Butte. The report has since been confirmed by J. W. Shields, of Butte. The gulch is eight or ten miles in length, and has nearly all been taken up in 20-acre claims. It is four or five miles below Highland gulch, and although prospected some in early days was never thoroughly examined. Mr. Shields reports that he and his partner have prospected the ground at different places along the gulch and have obtained as high as one dollar to the pan. The gold is coarse and very valuable, it being identical with the far-famed Highland dust. The gravel is ten ft deep and pays from the grass-root to the bed-rock. The gulch is admirably situated for mining, there being sufficient fall to work the ground with hydraulics. At present there are 1,000 inches of water in the creek, and this volume will be increased to 4,000 inches in the spring. Mr. Shields is confident the gulch will pay as well as any opened in the country, and further expresses the conviction that, having talked with men who visited the Ceur d'Alene country, he regards the Fish creek discovery as the most valuable of the two.

NOTES.—Inter-Mountain, Dec. 18: The Anaconda company is employing about 300 men in and around the Anaconda and St. Lawrence mines. The

important strike made some time ago in the Monton from the 400 level holds its own in good shape. Explorations in good ore are vigorously progressing. In the Bell the magnificent ore body discovered on the 400 level improves with development. The high grade copper ore body is fully eight ft wide. Operations are actively progressing in the 400 level of the Colusa. The ledge has been penetrated and an extensive body of low grade copper ore is reported. It is estimated that the upper levels contain enough ore to supply the smelter for two years. In the east end of the Magna Charta, Mr. Hall reports an extensive body of high grade ore. In some other parts of the mine the ore is of good grade but occurs in somewhat narrow streaks. On the editorial page of this issue the amount of the Lexington product for this year is estimated at \$1,400,000. This it should be understood is somewhat more than the company will realize, as the estimate is made on a basis of the market price of silver. The amount realized by the company, figuring bullion at \$1.05, will probably be between \$1,200,000 and \$1,300,000 as the result of the year's work. The financial statement of the Alice company is now being prepared, and will, we hope, prove amply satisfactory to the stockholders.

NEW MEXICO.

SHERMAN MINE.—Southwest Sentinel, Dec. 19: The ore is not of a very high grade, yet the average of it is equal to that of either Leadville or Tombstone. We have never seen any of the ore tested or assayed, but we think we would not be amiss in saying the average is not far from \$35 per ton. In fact Mr. Williams informed us that the many hundreds of tons worked in the mills here, within the last two or three years, have yielded from \$30 to \$40 per ton. Out of a dump pile of 60 or 70 tons of ore we could not break a piece that did not contain horn silver in quantity. The mine is now opened so that quite a force of men could be put to work.

GRAPHIC.—Thirteen tons of ore were recently shipped to Socorro for treatment, from the Graphic mine, in Cook's Peak district, and netted the owners \$102.75 per ton. This mine belongs to A. P. Taylor, Dick Hudson and Al Dart. This explodes the theory that the ore in that district is too low grade to pay for working.

CARLISLE.—Incident to the change of management at the Carlisle mine, the mill has been shut down. This, however, is but temporary. It will start up again about the 1st of January. We understand that the water supply at the mill has greatly increased, and it will thereby be enabled to run all its stamps on full time.

BREMEN MINE.—Silver City Enterprise, Dec. 21: The 128 tons of ore shipped from the Bremen mine two weeks since to the Socorro smelter averaged 109 1/2 ounces. The whole amount brought something over \$1,200. Billy Owens, foreman of the mine, guessed that the ore would average 110 ounces, and he came within half an ounce, which is pretty close guessing on ten car-loads of ore.

MOLLIE S.—J. C. Woodward left the city yesterday morning with a force of men to resume work on the Mollie S mine, which has, owing to litigation, lain idle for a year and a half past. The Mollie S is supposed to be one of the richest and most extensive lead mines in the Territory. It is now owned by John W. Terry, President of the First National Bank of Socorro.

BURROS.—Jack Panace closed the sale yesterday of the Blue Bell mine in the Burros. J. E. Boss, H. M. Carpenter, R. H. Wellington and M. France, all of St. Paul, Minn., were the purchasers. The consideration was \$12,000, \$7,000 of which was paid down.

SIERRA GRANDE.—Lake Valley Herald, Dec. 20: In the big cut there are only two men at work. Here the area of ore uncovered has been greatly extended and as they work south, toward the "bridal chamber" it is improving in quality, running 40 to 60 ounces to the ton. The ore body is 15 to 20 ft thick and is exposed quite a long distance. Here the ore is broken so easily that two men can keep two others busy running it out upon a tramway.

SIERRA BELLA.—This property needs a mill of its own. It has now 3,000 tons of milling ore piled on the dumps, while it is so far developed that 200 men could be put to work taking out ore, and it would be an easy matter to keep a 40-stamp mill running at its full capacity.

OREGON.

CALUMET.—Baker City Tribune, Dec. 14: Sol Center, Supt., reports as follows: I took six samples of the different classes of ore we were getting and had them assayed, and had the getting of a big assay anything to do with my selection of samples, I would have gotten greater results. I put the following assays in dollars, estimating copper at 14 cents per pound; No. 1 was a dark yellow decomposed quartz and went in gold \$10.67, silver \$1.46, copper \$27, a total of \$47.13 per ton. No. 2, a dark red decomposed quartz; gold \$1.24, silver \$4.80, copper \$42; a total of \$48.04 per ton. No. 3, gray outside, dark inside and hard; traces gold and silver, copper \$168. No. 4, bright yellow, rather decomposed quartz crystals; gold \$18.43, silver \$12.17, copper \$70; a total of \$100.60 per ton. No. 5 was of the peacock character and gave gold \$23.36, silver \$7.54, copper \$172; a total of \$142.90 per ton. No. 6, decomposed quartz looking like clay; gold \$31.13, silver \$18.17, copper \$28; a total of \$77.30 per ton.

After housing everything of value in the cabins and the deep drift, we left the mine at noon of Oct. 5th, it having been snowing and storming the four days previous, and the snow being 14 inches deep on the upper end of the plant.

NOTES.—Jacksonville Times, Dec. 21: Sargent Bros. of Brushy creek, in the Steamboat district, have their claims ready for water. They have been reeking considerably during the past few months and averaged over \$2 a day to the hand. Mining of the bed of Klamath river, which has become quite extensive, is about over for the season. Some companies have done quite well. Wm. McConnell having taken out several hundred ounces of gold during the past few months. In two weeks before quitting they took out \$4,100.

For Mining Shareholders' Directory, Stock Reports, etc., see page 13.

Geology of the Eureka District.

Mr. Arnold Hague contributes to the third annual report of the Director of the United States Geological Survey an abstract of his forthcoming monograph upon the general geology of the Eureka district. The final report, which will be illustrated by numerous plates, will be elaborate in detail, and pending its appearance the abstract referred to, which occupies 49 pages, is of great interest to scientific observers.

As Mr. Hague remarks, it is doubtful if within the province of the Great Basin there is any region of equally restricted area which surpasses the Eureka district in its grand exposures of Paleozoic formations, especially of the lower and middle portions of the series.

As the district, moreover, is one of great economic interest as the seat of an active mining industry, and has been, as well, the center of intense volcanic action, it was judiciously selected for a more careful survey and study than had heretofore been given to any region of sedimentary rocks in Nevada. Unmapped and only occasionally visited by geologists, but little had been accomplished, except for the immediate purposes of mining, towards investigating its structure or solving its many geological problems. It was known to be an exceptionally broad expanse of mountains, affording fine geological sections if properly worked out, and of special interest for the purposes of comparative study in other regions of the Cordillera. In this direction almost nothing had been done.

The monograph upon the Eureka district is purely geological in its scope, and is mainly a careful study and survey of a comparatively small block of mountains, which may be designated as the Eureka mountains, but which should not be confounded with the Eureka mining district, as several other well-known mining districts also lie wholly within this mountain area. This report upon the district will appear in two parts; one a volume of text, the other an atlas of topographical and geological maps and cross-sections, and as the text is, in great measure, explanatory of the atlas, the two should be considered as parts of the same work.

The text presents as concisely as is consistent with clearness and completeness the principal geological facts observed and such general deductions as have been drawn from their study. Accompanying the report are two special monographs, prepared by Mr. Charles D. Walcott and Mr. Joseph P. Iddings, the able assistants in the geological field-work of the survey.

The area covered by the geological and topographical survey of the Eureka district embraces a region of country twenty miles square. It is situated on the Nevada plateau, in Central Nevada, midway between the basin of Lake Lahontan to the westward and the basin of Lake Bonneville to the eastward. It lies partly in the county of Eureka and partly in the county of White Pine.

The meridian of 116° west from Greenwich passes just to the westward of the center of the examined area, and the 39° 30' parallel of north latitude crosses Ruby Hill, the seat of the present activity in precious metal mining.

On the Nevada Plateau the broad central north and south valleys, lying between meridional mountain ranges, reach an average altitude of 6,000 feet above sea level, the country falling away gradually on both sides till at Salt Lake, in Utah, the altitude is 4,250 feet, and at Carson and Humboldt Lakes, in Nevada, 3,800 feet above sea level.

In general the broader physical features of the Great Basin ranges are much the same all the way from the bold escarpment of the Sierra Nevada of California to the precipitous wall of the Wahsatch mountains of Utah, the distance in an east and west line being about 425 miles. They form long, narrow mountain uplifts with sharply-defined limits, rising with more or less abruptness above broad intervals of desert. In width they seldom measure more than eight miles, but frequently extend for more than 100 miles in length, with serrated peaks and ridges rising from 2,000 to 6,000 feet above adjacent valleys. For the most part they possess a simple topographical structure and a simple drainage system. They are characterized, more especially the lower ranges, by absence of trees, and in many cases are nearly bare of all vegetation, presenting rough, rugged slopes of naked rock.

On the higher parts of the plateau the ranges, reaching a greater altitude, partake more of an Alpine or sub-Alpine character. Precipitation of moisture is more abundant, as seen both in the more frequent rains of summer and snow of winter. A greater precipitation produces larger and more frequent streams, and a continued moisture favors a varied vegetation—the spurs and ridges being more or less covered with dwarfed and stunted forest growth.

These characteristic features distinguish the ranges of the Nevada plateau from those of Lake Lahontan and Lake Bonneville basins, which present a more arid and weird aspect. A striking feature of nearly all these ranges is their isolated position, only a few of them presenting outlying spurs or low lines of rolling foothills. Occasionally inferior ridges stretch diagonally across valleys connecting distant

ranges, and still more frequently outbursts of volcanic rocks in irregular flows serve to unite, in confused masses, bodies of sedimentary formations otherwise distinct.

The East Humboldt mountains, midway between the Sierra and the Wahsatch, form the most prominent range in the Great Basin. They present not only by reason of the greater number of rugged and commanding peaks—many attaining an elevation over 11,000 feet above sea level—but by their broad, massive proportions, long-unbroken ridges, and Alpine character, the boldest uplift on the Nevada plateau. Next west from the Humboldt occurs the Diamond range, followed by the Pinion range, with the broad Diamond valley lying between them. Southward the southern extremities of these two ranges enter the Eureka district and form a part of its mountainous region.

On the plateau, among the more marked exceptions to the long, narrow ranges which rid the surface of the country may be mentioned the Roberts Peak Group, connecting the Wahsatch with the Pinion range, the White Pine mountains, and the subject of the present report, the mountains of the Eureka district.

The Eureka district forms a rough mountain block standing out by itself, except for its narrow connections with the Pinion and Diamond ranges, almost as completely isolated from its neighbors as the longer parallel ranges. As a mountain mass, however, it has never received any distinct appellation which would include all its members, it being made up of portions of several ranges and short uplifted blocks so intimately connected and insculpted as to form both topographically and geologically a single group hemmed in on all sides by the characteristic detrital valleys. To the north, Diamond valley extends for over 40 miles in an unbroken plain, the lowest part of the depression being covered in winter by a broad sheet of water, which, upon evaporation, presents during the greater part of the year a hard level floor, strongly impregnated with salt. To the south of the district lies the broad basin of Fish Creek valley, connecting with Newark valley on the east side of Diamond range, while Antelope valley cuts off the Eureka district on the west side from the neighboring mountains.

It is doubtful if any area of equal extent in Nevada possesses more varied physical features with such strongly marked contrasts. In close proximity may be seen long serrated ridges, broad summits, gently inclined tables of nearly horizontal sedimentary beds, with abrupt escarpments along canyon walls, and highly tilted strata in rough irregular spurs. And as might be expected in a country made up of individual blocks and parts of ranges and so interlocked as to form one broad mass, the region is characterized by broad shallow basins, long narrow ravines and winding valleys, presenting a more than ordinarily accidented surface with an intricate structure. Above the broad base of the surrounding sage-brush valleys, which have an altitude of 6,000 feet above sea level, rise many prominent peaks from 2,500 to 4,500 feet. Diamond peak, in the northeast corner of the district, at the southern extremity of Diamond range, is the culminating point, measuring 10,637 feet above sea level, and, with the exception of the high summits in the East Humboldt range, is one of the loftiest peaks on the Nevada plateau. Prospect peak, on the central ridge, and the second point in the district, measures 9,604 feet, while Atrypa peak, to the southwest on the same ridge, has an altitude of 4,063 feet above sea level. Other points are White Cloud peak, the highest point on a broad plateau-like ridge, 8,950 feet, Alpha peak 8,985 feet, and Woodpecker's peak 8,598 feet, all of them being formed of sedimentary rocks. Among volcanic mountains may be mentioned Richmond mountain just east of the town of Eureka, which rises to a height of 8,392 feet; and Pinto peak, an isolated cone to the southward, which reaches an altitude of 7,880 feet above sea level.

Up to the time of the rapid development of the mining interests upon Ruby Hill and Prospect mountain, the slopes and ridges about Eureka were exceptionally well supplied with an arborescent growth, a condition which was due partly to the number of high peaks but in great part to broad masses of mountains acting as condensers of desert moisture. To-day, so great has been the demand for wood and charcoal in the reduction of lead ores, that the mountains are as bare of trees as any part of the Great Basin. Several species of pines, dwarfed junipers (*Juniperus occidentalis*), and mountain mahogany (*Cercocarpus laevis*), which attain a height of over 20 feet, are, or rather were, the prevailing trees, but are now only found in a few areas preserved by their owners for future use, at no distant day.

Nature presents a barren, arid appearance. Vegetation is everywhere limited, and is mainly confined to bunch grasses on the mountain slopes, and sage brush in the open valleys.

As the valleys are mainly filled with coarse detrital material from mountain slopes, soils suitable for agricultural purposes occupy very small areas, and are only found in the broader basins. In the favored spots where water for irrigation purposes can be readily obtained, all the more hardy vegetables grow well, and are of excellent quality, but nearly all crops suffer from early frosts. In no sense can the country be regarded as an agricultural one, and cultivation of the soil is only remunerative to the farmer by reason of the very high prices received for his produce.

A rigorous winter, a long, hot summer, a dry

atmosphere, with a light precipitation of moisture, are characteristic climatic features of the Eureka district. In summer rainfalls are limited to showers, frequently very severe, but of short duration, and what are popularly known as cloud-bursts are by no means uncommon during late July and early August. The clouds, late in the afternoon, centering over Prospect peak, break with such force that many people caught without warning have been drowned. In July, 1874, a severe storm and flood carried off seventeen lives, and destroyed property to the value of many thousands of dollars.

During the season of Mr. Hague's field operations snow fell in the month of May no less than 8 times and again on June 10th and 11th. In summer the days are warm, the nights cool. The daily variation between the maximum and minimum thermometers was always very considerable, frequently showing a difference of 50° Fahrenheit. As early as August 30th the thermometer fell below 32° Fahrenheit, and on October 9th a light fall of snow covered both mountain and valley.

In the summer of 1864 the first locations of mining property were made in New York canyon, on the eastern side of Prospect mountain. In mining operations very little was accomplished until the season of 1869, when important discoveries were made on Ruby Hill, and active, intelligent work was undertaken. From that time forward mining operations on Ruby Hill have gone on steadily, and to-day the Eureka district is the most successful mining region in the State of Nevada. Recent estimates of the value of the ore production of the district since the first shipment of crude bullion in 1869 are as follows:

From 1869 to 1873.....	\$10,000,000
From 1873 to January, 1882.....	40,000,000
Total.....	\$50,000,000

Around this industry has grown up the town of Eureka, which is the center of population and trade for this part of the State. It is a long narrow settlement, lying in the main northern drainage channel of the mountains, and sheltered on the east side by Richmond mountain.

The Eureka and Palisade railway, 88 miles in length, connects the town with the Central Pacific road at Palisade. Branch tracks connect with the Eureka Consolidated and Richmond furnaces, the former at the lower, and the latter at the upper end of the town, and these again by a somewhat sinuous course with the principal mines, which are situated about two and one-half miles southwest of Eureka. There are an imposing well-built court house, three or four churches, and several blocks of brick stores and warehouses in the town. It supports two daily papers, which have a considerable influence and a wide circulation throughout the State.

Ruby Hill, the only other town of any importance in the district, is a flourishing place, nearly the entire population being actively engaged in mining in the immediate neighborhood.

It is built on the north and east sides of an isolated hill which bears the same name, and on which are located all the more prominent mines, including the Albion, Richmond, Eureka Consolidated, Phenix, and Jackson properties.

Mr. Hague gives a detailed description of the topography of the mountain masses in and adjoining the district, and describes their geological structure and relations. He then discusses the Paleozoic formations—Cambrian, Silurian, Devonian, and Carboniferous—and presents a lithological study of the igneous rocks of the neighborhood, which he divides into pre-tertiary and tertiary and post-tertiary. One of the most interesting points developed is the grand exposure of Paleozoic rocks, which in the aggregate reach a thickness of no less than 30,000 feet, as is shown in the accompanying section:

Eureka Section, Nevada, 30,000 feet.	
CARBONIFEROUS, 9,300 FEET.	
Upper coal measures.....	500
Weber conglomerate.....	2,000
Lower coal measures.....	3,800
Diamond peak quartzite.....	3,000
DEVONIAN, 8,000 FEET.	
White Pine shale.....	2,000
Nevada limestone.....	6,000
SILURIAN, 5,000 FEET.	
Lone mountain limestone.....	1,800
Eureka quartzite.....	500
Pogonip limestone.....	2,700
CAMBRIAN, 7,700 FEET.	
Hamburg shale.....	350
Hamburg limestone.....	1,200
Secret canyon shale.....	1,600
Prospect mountain limestone.....	3,050
Prospect mountain quartzite.....	1,500

The ore occurs between the Prospect mountain limestone and quartzite. In the Silurian, between the Lone mountain limestone and the Eureka quartzite, is a plane of unconformity.

Mr. Hague's report upon the general geology will be followed by a monograph on the features connected with the economic structure of the district, by Mr. J. S. Curtis, who will discuss more particularly the origin, mode of occurrence, and relations, of the ore bodies which have made Eureka so productive and so famous.

The remains of De Long and comrades of the Jeannette expedition have arrived at Irkutsk. The remains were borne in procession through the streets, escorted by a detachment through multitudes of people who joined the cortege. Many wreaths were placed on the coffin, and printed copies of poems describing the exploits and unhappy end of the party were distributed among the crowd. The remains will be taken to America.

The Petroleum Business.

There were seventeen barrels of petroleum hauled into town yesterday from the Puente for Mr. F. S. Eaton, at the office of the City Water Company. This oil is from two shallow wells, one only sixty-two feet deep and caved in for lack of casing, and one a little deeper with the boring tools stuck fast in it. These cheaply made wells are being pumped by an engine that is used to sink another well, which already has oil in it, but the proprietors are determined to go deeper to get lighter oil and more of it. The oil from the shallow wells is heavy lubricating oil, that is in constant demand, far beyond the supply. The reservoir of lighter oil is supposed to be of vast extent and deeper down, but the heavy oil in the shallow wells is very profitable, and should induce the making of more and larger wells for this special kind of oil.

As an instance of the great change that has come over the public mind in regard to the Puente lands, it may be stated that 800 acres of land on which these wells are located was valued two years ago at about \$5 per acre, being only adapted to pasture, making the whole value of the tract \$4,000. Yesterday the owner refused an offer of \$50,000 for the same land of hills and dales.

It is evident that the parties wishing to buy had been reading the *Herald*, and had learned of the vast possibilities of the tract with its grass, asphaltum, oil, and prospective coal mines. That is a good indication of the way the world moves in the county of Los Angeles.

A lot of casing tubes went out yesterday for deepening the well at Puente, and also a lot of tubing for the Chandler & Bower well, which is being deepened, at the new settlement of Petrolia. Mr. Snow, at the same place, yesterday sent a new engine to drill deeper in his encouraging location. Good news every week may be expected from this promising field, where land has advanced one hundred and twenty times its value in two years.

When the first great well shall begin to give up its treasures in this locality, there will be a boom like that in Pennsylvania twenty years ago. Without waiting to go down for deep or flowing wells, it is evident that shallow wells will be very profitable for the production of heavy oil alone. The new coal discoveries in this section tend also to the advancement of the values of real estate in that part of the county. —*Los Angeles Herald*.

Safety Catch for Wire Rope Guides.

At the meeting of the Manchester (Theological Society, held on Dec. 4, Mr. W. Brown exhibited and explained a model of a patent safety catch for wire rope guides. The invention has for its object the prevention of accidents to pit cages by the breakage of the winding rope. For this purpose two or more levers are placed on each side of the cage on either side of the guide rod. These levers turn on pins secured to the sides of the cage, and which form the centers upon which the levers work. The ends of the levers nearest the guide rod are provided with hinge joints, from which extend upward suitable rods, having rollers concaved to the diameter of the guide rod, with sides extending outwards, and having flat circular surfaces to insure an effectual grip on the guide rods and the inclined planes which are fixed at the sides of the cage. The opposite ends of the levers are each secured by a hinge joint to connecting rods, to which a link is attached for securing the cage to the winding rope. When the cage is suspended the rollers are drawn away from the guide rods and the inclined planes, the whole weight of the cage being supported upon the connecting rods, as well as the pins or centers of the levers, the connecting or tie rod forming the connection between the rope and these centers. In the event, however, of the rope or any of the connections breaking, the whole weight of the cage is thrown upon the centers, causing the suspended ends of the levers to fall and the opposite ends to rise with the rollers into the inclined plane and grip the guide rods, whereby the cage is held, supported by its own weight acting upon the rollers in the inclined planes, thus preventing it falling down the shaft when unattached to the rope or other connections. As an additional safeguard, springs are also employed for pressing on the levers so as to insure that they are operated quickly in being forced against the guide rods immediately upon the breakage of the rope.

ASBESTOS ENAMEL.—Powdered asbestos is used by M. Erichsen, of Copenhagen, for making an enamel or coating to be applied to pipes, walls, and so on. The powder is mixed with soluble salts, such as silicate of potash, and mineral or other colors which combine with silicic acid, so as to form a product which resists the action of oxygen, heat, cold or damp. The coating furnishes a refractory glaze, which protects the material it is applied to, whether wood, gas or water pipes, and stone or brick buildings. When applied to masonry or wood the surface of these is first washed with soap and water. In preparing the enamel the refuse asbestos only need be employed. It is also proposed to apply the coating to boilers in order to protect the plates against a too intense fire.

FOURTEEN thousand cotton operatives in Lancashire are idle, in consequence of a strike. Half the looms in Blackburn are stopped.

THE ENGINEER.

A Stone Bridge over the Mississippi.

The first stone bridge across the Mississippi river has just been completed at a point a little below the Falls of St. Anthony. It is a massive stone structure, stretching to the east across the river, curving at first slightly to the left in a graceful sweep, and then running at right angles to the stream directly to the east side landing, the whole course being 2,100 feet. The upper surface of the bridge presents to the view a smooth stone roadway, carrying two tracks on four lines of steel rails and walled in on either side by heavy blocks of stone, high enough and strong enough to prevent a train from leaving the bridge, even should it be thrown from the rail. The viaduct crosses the river with twenty-three arches and sixteen spans of 80 feet each. The material is granite and magnesian limestone. The width is 28 feet over all, and the height from the springing point of the arches to the top is 50 feet 6 inches. The cost was \$990,000. The possibility of running at full speed over it will result in reducing the time between Minneapolis and St. Paul from thirty to twenty minutes.

TUNNELING INTO A VOLCANO.—A New York Mexican commercial house is in negotiation with parties in Mexico for the purchase of the volcano Popocatepetl, up the slope of which it is proposed to construct a railroad for commercial purposes and for convenience. Near the summit a tunnel will also be seen to strike a location within the crater, where there is known to be a large deposit of sulphur which may be safely approached. A representative of the house recently visited the volcano with the French engineer, Mr. Charles Roay. A contract is said to have been made for the exportation of 50,000 tons of sulphur a year at least. It is also proposed to establish a factory of sulphuric acid for use in Mexico, selling it at \$3 a quintal of 65 degrees strength. These products of Popocatepetl will add largely to the business of the Inter-oceanic railway. The purchase of a volcano is quite a novel enterprise, and the railway up the side of the highest mountain in North America will probably be largely patronized by tourists, who would go there by the thousands annually were good facilities offered to make the trip.

TWO HIGH BRIDGES.—The assertion that the new bridge of the New York, Lake Erie and Western Railroad, four miles from Alton, is the highest railroad viaduct in the world, is disputed by *La Nature*, which claims that pre-eminence for the bridge of Garabit, France. That remarkable structure is 1,800 feet long, and near the middle of the great central arch the distance from the bed of the river to the rail is 413 feet. The length and maximum height of the Erie bridge are said to be respectively 2,051 and 301 feet.

HEAVY ENGINES AND AMERICAN RAILROAD TRACKS.—Mr. O. Chanute states that heavy "consolidation" engines do not injure the track more than the lighter engines formerly did. Trains have been lengthened from 22 cars in 1874 to 38 in 1883; and the weights hauled, from 106 to 228 tons. By strengthening draw-heads, links and pins, accidents from breaking apart of trains have been diminished, and the cost of haulage has been reduced from one cent to a half-cent per ton per mile. —*Mechanics*.

THE ARLBERG TUNNEL.—The fragments of rocks dividing the eastern and western galleries of the Arlberg Tunnel were removed on the 19th of November, in the presence of a notable assemblage. Baron Von Friedenthal, the Austrian Minister of Commerce, delivered an address in German and Italian. There was much enthusiasm manifested on the occasion. Subsequently a special train passed through the tunnel from the west.

THE MISSISSIPPI JETTIES.—The establishment of deep water through the jetties at the mouth of the Mississippi River is now bearing fruit in the character of the shipping going to New Orleans. Before the completion of the improvements for opening the mouth of the river, that city could be reached from the sea only by vessels drawing 18 or 19 feet at the utmost, but now the largest vessels can get in without the slightest difficulty.

AN IMMENSE WATER POWER.—Experts say that Broad river, at Anthony Shoals, Georgia, has a volume of 19,000,000 cubic feet of water per minute, and its velocity is 175 feet per minute, its fall in a mile and a quarter being ninety-two feet. The horse power is calculated to be 37,286, while Lowell, the finest developed water-power in the United States, has only 16,000 horse power.

There is talk of bridging the Mississippi at New Orleans, where the river is 2,400 feet wide. An engineer proposes seven spans of 300 feet each, one to be a draw. The piers are to be creosoted piles, driven in clusters, and heavily capped and eased with iron. The depth of the water will be no obstacle, as the piles can be spliced.

USEFUL INFORMATION.

What an Educated Man Ought to Know.

Ruskin says an educated man ought to know these things: First, where he is—that is to say, what sort of a world has he got into; how large it is, what kind of creatures live in it, and how; what it is made of, and what may be made of it. Secondly, where he is going—that is to say, what chances or reports there are of any other world besides this; what seems to be the nature of that other world. Thirdly, what he had best do under the circumstances—that is to say, what kind of faculties he possesses; what are the present state and wants of mankind; what is his place in society; and what are the readiest means in his power of attaining happiness and diffusing it. The man who knows these things, and who has his will so subdued in the learning of them that he is ready to do what he knows he ought, is an educated man; and the man who knows them not is uneducated, though he could talk all the tongues of Babel.

Appropos to the above, Henry Ward Beecher, in a recent sermon, made the following remarks, which have the "right kind of ring" to them: Some men think that because they have had no tumultuous experience that they are not converted. That is not the case. Where a man says to himself, "Here, I am not satisfied with my present mode of life, and I am going to change it," he is convicted. A sudden change from absolute darkness to absolute light is not necessary. All education is gradual, unfolding. A man who gets up in meeting and relates a most startling experience that he has had of sudden and complete change is not necessarily to be set down as a liar, but neither is he to be taken as a leader. I heard a man say once: "I smoked and chewed and snuffed at a terrible rate, but when I found the grace of God from that instant I never had the slightest desire for tobacco." Well, setting aside the theory that he lied—which may be uncharitable—I will say that out of forty millions of men he is the only one that could say that, and if the forty millions of men waited until they got rid of their lusts in that way they would forever wallow in them. I do not want you to imagine that here is a gospel churn into which you are to be poured and come out better. What I want to know is, are you discontented with the way in which you are living, and do you want to change? To join the church for business reasons is mean; to join the church for fear you will otherwise be damned is meaner yet. To try to indulge in everything that is low and vile in this life, and then to top off the loaf with God's sugar of mercy, is very mean.

DURABILITY OF IRON AND STEEL RAILS.—Some interesting statistics are given in the *Revue Industrielle* concerning the comparative durability of iron and steel rails, deduced from the accounts kept by the engineering department of the Grand Central Railway of Belgium. From these it appears that the failure of iron rails begins immediately after they are laid—usually from exfoliation, or in consequence of defects in manufacture showing themselves in some other way—so that the work of replacing them goes on continuously, the old being renewed by the end of 15 or 20 years. With steel rails the loss was found to be, for 12 years, almost nothing. Out of 520 rails laid in 1869 only one has been renewed up to the 1st of January, 1882, and this one had been broken by an accident; but before the year 1882 was over 257, or nearly half, the rails of 1869 were condemned and replaced with new ones. The reason for discarding the old rails was that their surface had been worn away to a depth of 13 mm., which is the limit of service adopted by the company, and the fact that half the rails laid 13 years before reached this limit at the same time is of much interest, as showing the uniformity of wear in the metal. Under ordinary circumstances the life of good steel rails would be much longer than 13 years; but in this particular case they were used upon a short piece of track, with a grade of 100 feet to the mile, and subjected to the effect of the movement of 30 heavy freight trains a day, descending the steep grade with the brakes on.

ARTIFICIAL IVORY.—The French *Chronicle of Industry*, of a recent date, gives an account of a new method of making artificial ivory from bones and scraps of white sheepskin. The bones are first soaked from 10 to 15 days in a solution of chloride of lime, after which they are washed in water and dried; they are then mixed with scraps of white leather, put in a large kettle and boiled, forming a conglomerate mass of the whole, to which is added 21 per cent of alum. As fast as any seam or froth rises to the top it is skimmed off, the boiling being continued until the liquid clarifies. The proper coloring matter is now added and the boiling stopped. The liquid, which has now partially cooled, is strained through a cloth into a cooler, where it is left until it has hardened to such a degree that it will not pass through the meshes of the cloth. The mass is then further dried upon frames, after which it is hardened by placing in a cold alum bath for 8 or 10 hours. The total amount of alum required in the process is equal to one-half the weight of the finished ivory. The ivory, when taken from the alum bath, is washed in clear

water and allowed to dry in the air. It is said that this artificial product is easily worked, and takes as high a polish as real ivory.

CLEANING BRASS.—The government recipe for cleaning brass, used in the arsenals, is said to be as follows: Make a mixture of one part common nitric acid, and one-half part sulphuric acid in a stone jar; then place ready a pail of fresh water and a box of sawdust. Dip the articles to be cleaned in the acid, then remove them into the water after which rub them with sawdust. This immediately changes them to a brilliant color. If the brass is greasy it must be first dipped in a strong solution of potash and soda in warm water; this cuts the grease so that the acid has the power to act. The *Manufacturer* says that rusted steel can be cleaned by washing with a solution of half an ounce of cyanide potassium, in two ounces of water, and then brushing with a paste composed of half an ounce of cyanide potassium, half an ounce of castile soap, an ounce of whiting and sufficient water to make the paste. —*Cornwall Reflector*.

TO CLEAN MIRRORS.—Take a newspaper or part of one, according to the size of the glass. Fold it small and dip it into a basin of clean cold water; when thoroughly wet squeeze it out in your hand as you would a sponge, and then rub it hard all over the face of the glass, taking care that it is not so wet as to run down in streams. In fact, the paper must only be completely moistened or dampened all through. After the glass has been well rubbed with wet paper, let it rest for a few minutes, and then go over it with a fresh, dry newspaper, folded small in your hand, till it looks clear and bright, which it will almost immediately and with no further trouble. This method, simple as it is, is the best and most expeditious for cleaning mirrors, and it will be found so on trial—giving a cleanness and polish that can be produced by no other process.

TO TIN A NEW SOLDERING-IRON.—The old fashioned way is to file your iron or copper on the point into the shape you want it, put it into a clean fire and heat it until it will melt solder easily, wipe it clean and rub it on a pine board with rosin and solder until the point is tinned as you want it. The new way is to heat as above and wipe clean, then apply soldering fluid (made from zinc dissolved in muriatic acid), to the point where you want the tin, and rub it on a board with solder as above.

GOOD HEALTH.

How to Reduce Fat.

We copy the following, with some slight omissions, from an editorial in Dr. Dio Lewis' monthly:

I have called to consult you about the strangest thing in the world. I will tell you all. I am twenty-three years old. When I was nineteen I weighed one hundred and twenty-two pounds; now I weigh two hundred and nine; I am filling up with fat. I can hardly breathe. The best young man that ever lived loves me, and has been on the point of asking me to marry him; but of course he sees I am growing worse all the time, and he don't dare to venture. I can't blame him. He is the noblest man in the world, and could marry any one he chooses. I don't blame him for not wishing to unite himself to such a great tub as I am. Why, Doctor, you don't know how fat I am. I am a sight to behold. And now I have come to see if anything can be done. I know you have studied up all sorts of curious subjects, and I thought you might be able to tell me how to get rid of this dreadful curse.

She had been talking faster and faster, and with more and more feeling (after the manner of fat women, who are always emotional), until she broke down in hysterical sobs.

I inquired about her habits—table and otherwise. She replied:

"Oh, I starve myself; I don't eat enough to keep a canary bird alive, and yet I grow fatter and fatter all the time. I don't believe anything can be done for me. We all have our afflictions, and I suppose we ought to bear them with fortitude. I wouldn't mind for myself, but it is just breaking his heart; if it wasn't for him I could be reconciled."

I then explained to her our nervous system, and the bearing certain conditions of one class of nerves has upon the deposition of adipose tissue. I soon saw she was not listening, but was mourning her sorrow. Then I asked her if she would be willing to follow a prescription I might give her.

"Willing? Willing? There is nothing I would not be willing to endure if I could only get rid of this horrible condition."

I prepared a prescription for her, and arranged that she should call upon me once a week, that I might supervise her progress, and have frequent opportunities to encourage her. The prescription which I read to her was this:

First. For breakfast, eat a piece of beef or mutton as large as your hand, with a slice of white bread twice as large. For dinner, the same amount of meat, or, if preferred, fish or poultry, with the same amount of farinaceous

or vegetable food in the form of bread or potato. For supper, nothing.

Second. Drink only when greatly annoyed with thirst; then, a mouthful of lemonade without sugar.

Third. Take three times a week some form of bath in which there shall be immense perspiration. The Turkish bath is best. You must work, either in walking or some other way, several hours a day.

"But, Doctor, I can't walk; my feet are sore."

"I thought that might be the case, but if the soles of your shoes are four inches broad, and are thick and strong, walking will not hurt your feet. You must walk or work until you perspire freely, every day of the week. Of course you are in delicate health, with little endurance; but as you have told me that you are willing to do anything, you are to work hard at something six or seven hours every day."

Fourth. You must rise very early in the morning, and retire late at night. Much sleep fattens people.

Fifth. The terrible corset you have on, which compresses the center of the body, making you look a great deal fatter than you really are, must be taken off, and you must have a corset which any dressmaker can fit to you—a corset for the lower part of the abdomen, which will raise this great mass and support it.

"This is all the advice I have to give you at present. At first you will lose half a pound a day. In the first three months you will lose from twenty to thirty pounds. In six months, forty pounds. You will constantly improve in health, get over this excessive emotion, and be much stronger. That you may know exactly what is being done I wish you to be weighed; write the figures in your memorandum, and one week from now, when you come again, weigh yourself and tell me how much you have lost."

I happened to be out of the city and did not see her until her second visit, two weeks from our first meeting. It was plain when she entered that already her system was being toned up, and when we were again in my private office she said:

"I have lost six and a half pounds; not quite as much as you told me, but I am delighted, though nearly starved. I have done exactly as prescribed, and shall continue to if it kills me. You must be very careful not to make any mistakes, for I shall do just as you say. At first the thirst was dreadful. I thought I could not bear it. But now I have very little trouble with that."

About four months after our first meeting, this young woman brought a handsome young man with her, and after a pleasant chat, she said to me:

"We are engaged; but I have told my friend that I shall not consent to become his wife until I have a decent shape. When I came to you I weighed two hundred and nine pounds. I now weigh one hundred and sixty-three pounds. I am ten times as strong, active and healthy as I was then, and I have made up my mind, for my friend has left it altogether to me, that when I have lost ten or fifteen pounds more, we shall send you the invitations."

As the wedding day approached she brought the figures one hundred and fifty-two on a card, and exclaimed, with her blue eyes running over: "I am the happiest girl in the world! and don't you think I have honestly earned it? I think I am a great deal happier than I should have been if I had not worked for it."

The papers said the bride was beautiful. I thought she was, and I took a sort of scientific interest in it.

We made the usual call upon them during the first month, and when, two months after the wedding, they were spending an evening with us, I asked him if his wife had told him about my relations with her avoirdupois? He laughed heartily, and replied:

"Oh! yes, she has told me everything, I suppose; but wasn't it funny?"

MILK AND INFECTIOUS DISEASES.—The sanitary inspector who investigated an outbreak of typhoid fever in a populous London district traced the epidemic to a dairy farm where the vessels used for milk were washed with water from a well that had been contaminated by the drainage from a cesspool. In the houses of those who worked on the farm there had been cases of the fever, and the theory was that the milk had been infected with disease germs. Wooden pails are used in England for milking, and naturally furnish a better lodgement for germs than the tin pails used in this country. It is reported that a similar outbreak has occurred at Port Jervis, N. Y., and the milk from a certain farm is supposed to be the spreading cause, since 56 out of the 75 persons attacked were supplied with it. How it became infected is being studied by chemists and sanitarians. Proper sanitary precautions at all times and extreme vigilance during the prevalence of disease on the farm would banish such outbreaks. Too much care cannot be exercised in the disposal of the excreta from persons suffering from typhoid fever. Under favorable conditions the germs are washed by water, which will carry them along with it; if allowed to dry, they permeate the air—in both cases endangering health. Burying deep in the earth is not a sure way, since they will not lose their power in years. Burying seems the most reliable method of destroying them. —*Scientific American*.

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SAN FRANCISCO:

Saturday Morning, Jan. 5, 1884.

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Anderson's Concentrating Mill.

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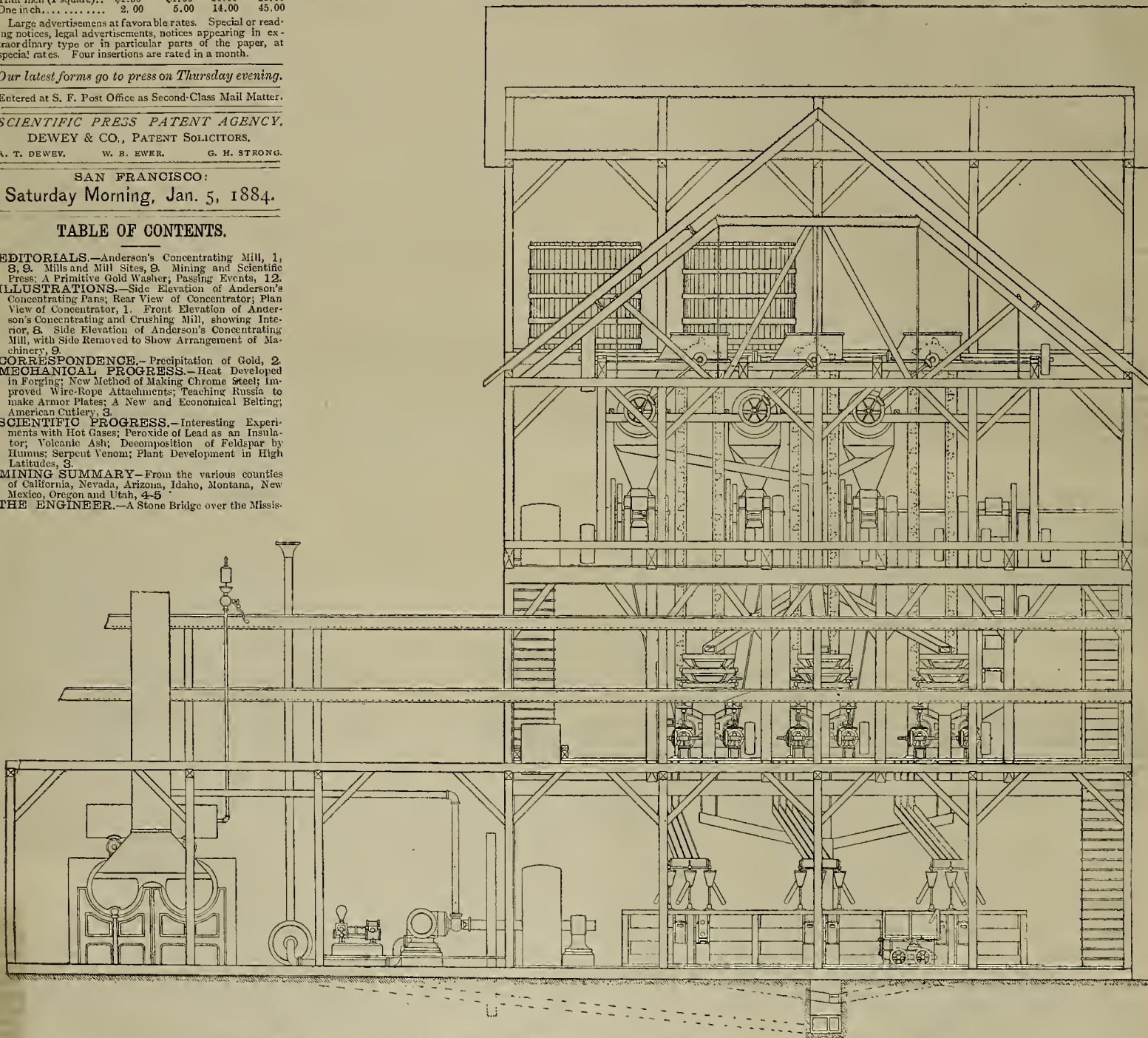
vators or sluices for carrying tailings to and
from the machine. The mode of operation is
to clear the valve of the upper pan, thereby
saving the floured quicksilver and amalgam in
the tailings, separate from the concentrates;
also amalgamating to a certain extent. The
lower pans do the concentrating; the concen-
trates are discharged continuously by regulat-
ing the valves in the bottom of the pan, or as
desired.

For placer and fine gold diggings the machines
are on wagons and run by portable engines with
elevators for supplying machines and conveying
tailings to a suitable dump. All the pans are
charged with mercury, the valves being securely

crushed to pass through 60, 30 and 20 mesh
screens. The crushing goes on gradually
through rock-breakers and rollers; and the ores
are screened after each crushing whilst passing
from the rock-breakers and through the rollers,
which is done to prevent the "sliming" of the
soft metal in the ores. Each concentrating ma-
chine works the different grade of screenings—
One the 60; one the 30; and one the 20. The
valves in the bottoms of the pans are regulated
to discharge the heavy materials continuously,
or as desired. The capacity of a mill like this
is 150 tons per 24 hours.

The engravings show the arrangement of the
mill, and are sufficiently clear for any one
familiar with this class of machinery to follow
the operation. The ore is dumped from wagons
or cars through the floor of the tank room, pass-

of the lower rock-breaker is fed into the ele-
vator conveying it to the revolving screen and
crushing rolls by an adjustable automatic feeder,
which is regulated at will to any desired amount
of feed. The upper rock-breaker crushes the
coarser rock, which falls to the lower rock-
breaker and is re-crushed. After crushing in
the rock-breaker the ore is screened by a re-
volving screen—wire cloth. The upper ends of
the inclined revolving screens are 60-mesh, the
middle 30-mesh, and lower ends 20-mesh. The
coarser ore that does not go through the screens
falls from the lower ends to the crushing rolls,
where it is re-crushed and elevated to the next
revolving screen and screened as before, falling
to the crushing rolls, where it is crushed still
finer, and elevated to the next revolving screen
and screened as before, falling to crushing rolls,



FRONT ELEVATION OF ANDERSON'S CRUSHING AND CONCENTRATING MILL SHOWING INTERIOR.

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See Advertising Columns.

closed. At will the valves can be opened, the
mercury and gold discharged and strained
through canvas or chamois skin, freeing the
gold from the mercury; then the mercury can
be returned to the pans. The capacity of ma-
chines of this class is 100 cubic yards per 24
hours.

The Crushing and Concentrating Mill.

They may be used for silver, copper, lead,
platinum, tin, antimony, cinnabar and sulphuret
ores. The machines are run in combination
with crushing rollers and Blakes's rock-breakers.
Mr. Anderson recommends two rock-breakers,
15x10; three sets of crushing rollers, 30x12;
four elevators; four revolving screens; three
concentrating machines; grizzly screens; two
automatic feeders; 80-horse power Corliss engine
and four boilers, 54x16. The ore should be

ing down and screened by the grizzly rods, the
coarse ores passing to the floor of the upper rock-
breaker, and the finer ores screened through the
grizzly rods are received by an ore bin under
the grizzly. The fine ores in the bin are fed by
an automatic ore feeder to the elevator convey-
ing the ore to the lower rock-breaker, where
it is crushed and falls to a self-adjusting hop-
per underneath the rock-breaker, which is in
connection with the automatic feeder of the ore
bin. When an over-regulated amount of ore is
in the hopper it lowers one-quarter of an inch,
thereby throwing the automatic feeder at ore
bin out of gear, and stopping the feed to the
rock-breaker.

As the ore is worked from the hopper it re-
turns to its former position, and puts the feeder
at the bin in motion. The ore from the hopper

where the crushing is completed, this set of
rolls being adjusted to run closely together.

Underneath each revolving screen there are
three hoppers for receiving the screened ores.
The boppers are connected by spouts uniting
the 60 mesh screens, the 30, and the 20 mesh
screens, thereby keeping the different grades of
screenage separate from each other. Water is
supplied to the bottom of the elevators leading
to revolving screens, and is also trickled
through perforated gas pipe over screen wire of
the revolving screen, and a certain amount of
water is supplied to each set of crushing rolls
as desired. The water supply of the mill is
preferably passed through the heater of the
boiler room, heated by exhaust steam of the
engine, and thence to the tanks on the upper
portion of the mill. From there it is distrib-

uted. Each concentrating machine works the different grade of screenage; one the 60-mesh, one the 30, and one the 20-mesh screenage.

The concentrated metals and ore are conveyed from the machines by sluices to distributors at settling tank, which can be adjusted to convey the concentrate to any desired vat or tank. After settling a desired time the water can be drawn off from the concentrate by removing the plugs in the holes of the vats. The concentrates are then shoveled into cars and conveyed to sacking and shipping rooms, or to reduction and refining works. The tailings from the concentrating machines are carried away by sluices.

The object of screening after each crushing is to prevent the "sliming" of the soft metals in the ores. The crushing goes on gradually until the ores are freed of the soft metals. Then the crushing is forced to completion.

Mr. Anderson furnishes the following estimates of cost of operating this mill for

Mills and Mill Sites.

As a matter of reference for mill men and mill owners, we have selected from all available sources, and present in condensed form, the various laws, rulings and decisions on the subject of mills and mill sites.

Mill sites may be located under the provisions of the mining statutes, and if located should be recorded in the customary manner. Section 2,337 of the U. S. Revised Statutes provides that "where non-mineral land not contiguous to the vein or lode is used or occupied by the proprietors of such vein or lode for mining or milling purposes, such non-adjacent surface ground may be embraced and included in an application for a patent for vein or lode, and the same may be patented therewith." It has been uniformly construed by the Land Office that land contiguous only to the surface ground of a lode claim was not within the prohibition named, and this would ordinarily oc-

stands upon equal footing, and a late appropriation for mining purposes is not good against a prior appropriation for a mill.

A person who has built a mill on a stream and appropriated a part of its water to propel machinery does not lose his prior right over one who has claimed the water below him for mining purposes by a sale of his interest in the water of the stream to be used in a ditch above.

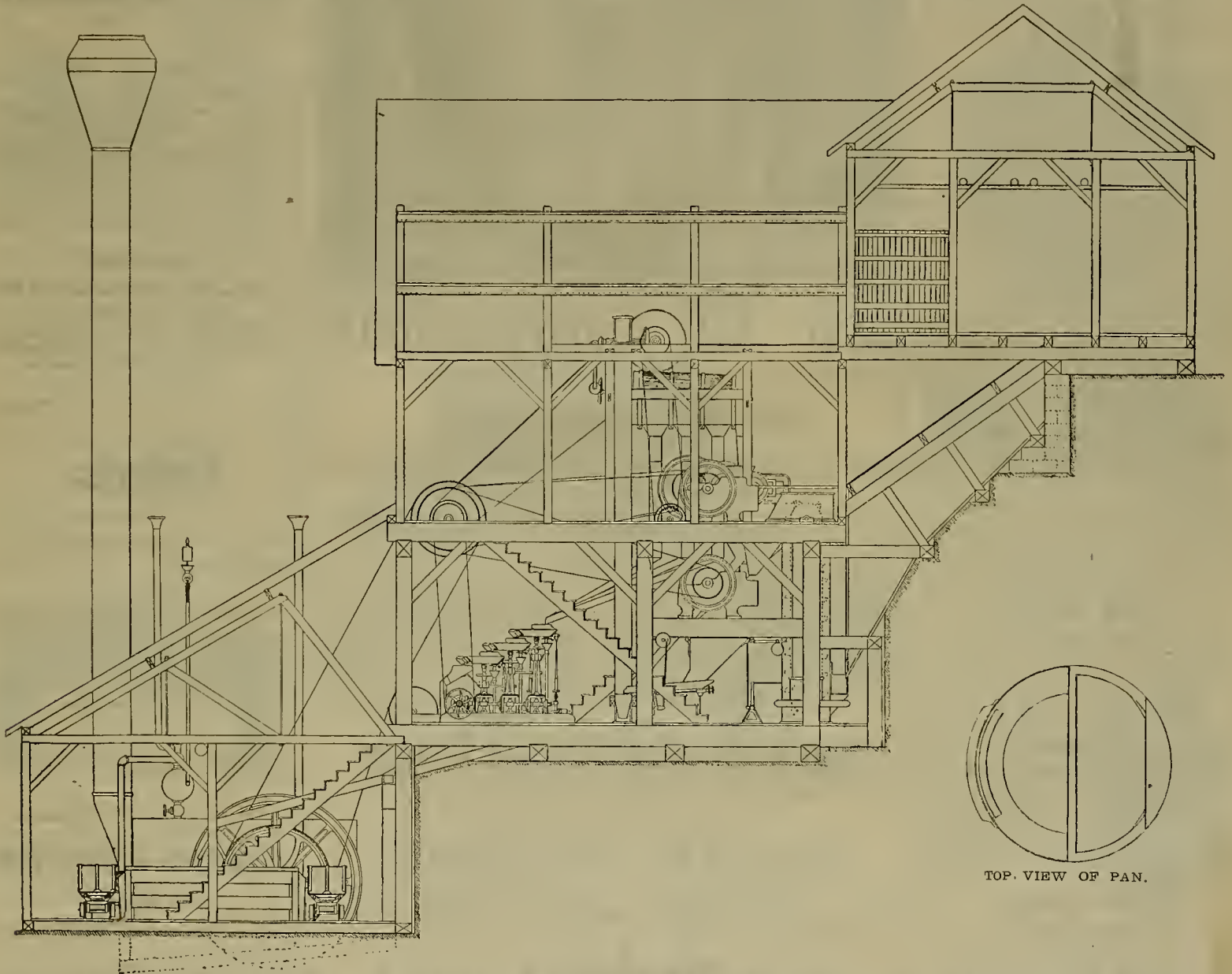
Where certain persons subscribe money toward building a quartz mill, in which all the subscribers were interested, and the subscription paper, without naming any payee, provided that the money was to be paid in such manner and at such time as a majority of the subscribers might order, a Nevada court holds that the subscription was for the mutual benefit of all the subscribers.

Amalgamating machinery in a quartz mill, pans, bottoms, etc., have been held to be realty, and as such cannot be treated as personality on

Hauling quartz to a quartz mill is "performing labor for carrying on the mill," and gives the laborers a lien on the mill.

Where a mechanic's lien on a quartz mill describes the land around the building on which a lien is claimed, in these words, "with such convenient space of ground around the same as may be required for the convenient use and occupation thereof," the description is sufficient; but it is proper for the court, by its decree, to define the amount and extent of land connected with the building which is properly subject to the lien; and if the decree follows the description in the lien, it is doubtful whether the purchaser will acquire any land beyond that covered by the building.

James and Hill were the owners of a quartz crushing mill with some vacant land adjoining. They leased the vacant land to Farrington & Mier, proprietors of neighboring amalgamating works, and agreed to crush the ore for the amalgamating works for \$5 per ton, to place it



SIDE ELEVATION OF ANDERSON'S CONCENTRATING MILL WITH SIDE REMOVED TO SHOW ARRANGEMENT OF MACHINERY.

twenty-four hours: Two firemen, \$6; 2 engineers, \$8; 4 men, concentrating tanks, \$12; 2 men, concentrators, \$8; 2 men, rock-breaker, \$6; 2 roustabouts, \$5; 1 superintendent, \$15; 1 team, \$2; 6 cords wood, \$36; oils and incidentals, \$10; total, \$108. Capacity of mill for 24 hours, 150 tons; cost of crushing and concentrating, 72 cents. Mr. Anderson has carefully figured out the lumber, materials, etc., for a mill of this capacity. The lumber for the engine, boiler and tank rooms would be 43,974 feet; for the crushing and concentrating rooms, 62,663 feet; for the ore house and tank room, 33,566 feet; total, 140,203 feet. It would also require 74,000 shingles, 28,000 brick, and other things according to position. Mr. Anderson sends us also complete specifications for machinery, hardware, belting, etc., for a mill such as we have described. All these figure up in weight 174,858 pounds, or about six carloads.

THERE is a mining "boom" in the vicinity of Nashville, El Dorado county.

cur where the mill site is located contiguous to the side lines of the surface ground. Where a mill site abuts against the end of the lode it is not subject to purchase and entry.

The Mining Act of 1872 provides for patenting—1, lode claims; 2, placer claims; 3, mill sites; and 4, lode claims and mill sites, and the plat and field notes of either of these classes of claims must show an expenditure of not less than \$500 on the claim in actual labor or improvements.

When a party applies for a lode claim and mill site in the same application the law does not require that \$500 shall have been expended on the mill site, but on the lode claim only.

A notice of appropriation of a right of way for a water ditch is not a notice of the appropriation of the land on the sides of it, nor of a mill site in connection with it.

The location of a mine site is not an appropriation of water for purposes of the mill site. The appropriation of water for all purposes

account of contract between parties.

Boilers and engines in a quartz mill erected by a tenant are trade fixtures which he has a right to resume during tenancy.

The interior of a fixture in a dwelling is actual and permanent fastening to the freehold, but this is not a criterion to a fixture in a manufactory or a mill.

Mill sites must be non-mineral in character. Mill sites pass to a railroad, if located on a railroad section after the grant to the railroad took effect.

An applicant for a mill site, on which a lode exists claimed by other parties, may file an abandonment of the lode claim, and will secure a patent for the balance of the mill site.

Work done on a quartz mill and work done in a quartz mine is work on two different parcels of property, and the lien upon each cannot by agreement be apportioned arbitrarily between them, although done under one original contract.

on the ground leased, and also furnish motive power to the amalgamating works. After the arrangement James became a partner in the firm of Farrington & Mier, in the amalgamating works. In a suit the court held that neither the lease, the contract, nor the association of James made Hill a partner in the amalgamating works.

Right to water acquired by appropriation may be transferred like other property, and the transfer of a mill carries its water privileges.

The interest in water acquired by one who locates on the bank of a stream and appropriates its waters for machinery, is not property in the water as such, but the right in the momentum of its fall at the point of location, and to the flow of the water in its natural course above.

It is said that mining locations have been laid for a space of five miles along the western side of Mt. Davidson. It might astonish some if the west side should prove as rich in mines as the east side of the old mountain.

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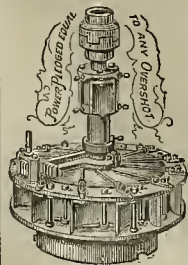
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6. The wearing parts are easily duplicated.
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Mining and Scientific Press.

It is the intention of the publishers to keep the MINING AND SCIENTIFIC PRESS abreast of the times, and to make what improvements in it are possible during the coming year. Several double numbers are contemplated, the first of which will appear on January 19th, when our annual mining review will be given. The others will be duly announced.

In beginning the forty-eighth volume, which occurs with this number, we are confident that the PRESS will continue to merit the patronage it receives. All information, which is at all of a practical character, that can be obtained for the mining community, finds place in its columns. The carefully collated and condensed "mining summary," two full pages of which, in fine type, are given each week, presents in simple form, suitably arranged by States, Territories, counties and districts, all the current news. The departments of mechanical and scientific progress, and "good health," give weekly such varied items in the respective lines as are of general interest, and represent the freshest news and progress.

The "Mining Shareholders' Directory" gives, in condensed form, the business features of the mining companies. The quotations of the stock market are tabulated and the notable features commented on. The second page has, each week, correspondence from different localities on subjects connected with the industries represented by the paper. Our list of correspondents has increased, and we expect even a larger circle this year. The editorial pages treat of such live topics as are of interest to the miner, prospector, millman, metallurgist or mechanic. The subjects selected are such as are of a practical character. The engravings are mainly of appliances connected with mining, metallurgy or mechanics, and of these we have made a specialty. No journal of its class in the world gives so many engravings of this character as the PRESS. They are of special value as showing graphically all the progress in these lines. During the coming year we expect to have a great many engravings of new mining appliances. This feature alone is worth much more than the subscription to any mining man.

In short, we shall make as many improvements in the PRESS as possible, and trust that our readers will assist us all in their power. We are glad to receive correspondence, information, hints of any kind that will better our journal. We hope all our old subscribers will remain with us, and that our lists will be increased, as the better our patronage the better paper we can give.

A Primitive Gold Washer.

Auriferous sands occur on most parts of the central provinces of India. The Chutia Nagpur province includes the greater portion of the hilly region on the southwest frontier of Bengal, and is divided into a number of districts. The class who follow the trade of gold washing have different names according to locality. In some of the tribes the women wash for gold; in others not. The methods employed by the different tribes seem to be identical. Each occupies a distinct tract, and poaching on one another's streams is not indulged in. The wooden dish used for washing measures about 28 by 18 for the men, smaller ones being used by the women and children. The dish is hollowed somewhat eccentrically to a maximum depth of 2½ inches. A scraper formed of a flattened iron hook is used to collect the auriferous sand and gravel that accumulates about the rocks in the streams.

The dish when filled is placed in shallow water, and the operator working with his hands soon separates and throws aside all the coarser gravel and stones, while the agitation of the water serves to carry away all the mud and lighter portions. The dish is then balanced on the palm of the left hand, and oscillated to and fro with the right.

This serves to throw off the greater portion of the remaining gravel, and the process is completed by a circular motion which is communicated to the water in the hollow of the dish, by which even the smallest particles of foreign matter are separated, and the final result is a residue of black iron sand in which the specks of gold are readily apparent; but as mercury is not used in that part of the world all the very small and invisible gold is lost. As soon as the miner has obtained gold enough for his day's subsistence he stops work, a somewhat philosophic habit which prevents the production of Anderson bonanza kings.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.]

FOR WEEK ENDING DEC. 18, 1883.

- 290,305.—POTATO DIGGER.—A. Adam, Reno, Nev.
290,530.—SINGLE HARNESS.—C. W. Burgdorf, Petaluma, Cal.
290,316.—COOKING STOVE.—Robt. E. Burns, S. F.
290,629.—SMELTING REFRACTORY ORES.—J. Campbell, S. F.
290,404.—HOISTING CAR.—L. D. Davis, Salt Lake City, Utah.
290,410.—DIRT SCRAPER.—D. A. Faulkner, Sac.
290,337.—VAPOR LAMP BURNER.—Ludwig & Wainwright, S. F.
290,348.—GANGWAY LADDER.—C. Olsen.
290,603.—SEWER TRAP.—L. A. Peller, San Jose, Cal.
290,352.—PORTABLE DOOR FASTENER.—E. F. Pfund, Sac.
290,358.—EDGER.—Jas. A. Robb, S. F.
290,481.—BOX COVER ATTACHMENT.—Belle M. Sahlein, S. F.
290,607.—AUTOMATIC LAMP EXTINGUISHER AND WICK TRIMMER.—Smiley & Stombs, S. F.
290,653.—WINE AND CIDER PRESS.—Henry Tyack, Grass Valley, Cal.
290,298.—DUMPING CAR.—Geo. J. Wheelock, Oakland, Cal.
290,509.—GATE.—J. B. Whiteman, Centerville, Oregon.
10,799.—TRADE MARK.—Geo. Simmonds, S. F.
3,774.—LABEL.—Meyer Eros & Co., S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

LOGGING LOCOMOTIVE.—John Dolbeer, S. F. No. 290,756. Dated Dec. 25, 1883. This is an apparatus in which is produced a traction and a rope-winding or hauling engine in one mechanism, which the inventor terms a logging-locomotive. It consists of an engine and boiler mounted upon a suitable frame supported upon wheels, which are adapted to run upon a track, and a gipsy or winding drum, mounted upon the forward part of the same frame, and a suitable mechanism by which the power may be applied to drive the wheels and move the locomotive along the track, or to actuate the winding apparatus. The locomotive will haul a train of log-cars to a point near the tender. The locomotive being brought to a convenient place, is disconnected and fixed by brakes or chocks, and the rope, after passing around suitably placed snatch-blocks, so that the pull from the gipsy will be nearly in direct line, is secured to the log, which is often inconveniently or inaccessible located, and it is hauled to the side of the track and loaded upon the car. When the load is complete the rope may be thrown off the gipsy and the locomotive connected, when it will be ready to haul the load to its destination.

SAFETY FENDER FOR CARS.—P. H. Cooney, S. F. No. 290,746. Dated Dec. 25, 1883. This invention is of that class intended to be applied to street-cars to prevent people from injury in getting under the car. The invention consists in a two-part swinging or hinged guard having a rubber nose-piece traveling just above the road-bed. The peculiar connection between the guard and the car-platform, the means for effecting its operation, and certain novel cushions and shields further constitute the invention. The object of the invention is to provide a guard or fender which shall be able to accommodate itself to the interior of the car-body on its springs, and to the inequalities of the road, remaining at all times in position to ward off injury to persons by preventing them from getting under the car and wheels.

BOOT.—Bernard Getelson, S. F. No. 289,525. Dated Dec. 4, 1883. This improvement in the construction of boots is more especially adapted for heavy boots, such as are used for farming or mining purposes. The leg and foot of the boot are made in the usual form. It is often difficult to remove boots when they have become wet, and efforts to do so will break down the counter. In order to render it easy to remove the boot, the inventor secures a plate between the sole of the boot and the heel layers, allowing it to extend forward far enough to be held firmly in place. The rear end projects out slightly, and forms a catch, which may be hooked over any stationary object to assist in removing the boot, which may thus easily be done. The counter of the boot is never broken, and no special boot-jack is needed.

WATER-MOTOR.—Samuel S. Richardson, Happy Camp, Del Norte Co. No. 289,560. Dated Dec. 4, 1883. The new and useful water-motor covered by this patent is intended to combine the power of the ordinary rotating spouts with that of a water-wheel by utilizing the waste of the former. It consists in a centrally-mounted water-wheel, and in a series of curved spouts, so mounted in connection with said wheel as to direct their discharge against the wheel to rotate it in one direction, while they themselves rotate in an opposite direction. The arrangement of parts utilizes the power

ordinarily wasted by the discharge of the rotating wheel, and gives a combined power which may be used for any suitable purposes.

PORTABLE LADDER FOR GATHERING FRUIT. Luther H. Titus, San Gabriel, Los Angeles Co. The invention relates to certain improvements in apparatus for gathering fruit from trees. It consists of a horizontal frame supported midway on wheels, and having anchors at the end by which it is held in place, a ladder pivoted to hangers below the frame and extending in an inclined direction upward, and a flexible tube or chute with openings at intervals through which the fruit may be introduced into it, together with a peculiar receiving bag upon the frame into which the fruit passes, and from which it may be distributed at intervals.

CENTRIFUGAL PUMP AND WATER WHEEL.—Samuel S. Richardson, Happy Camp, Del Norte Co. No. 289,559. Dated Dec. 4, 1883. This invention consists in an inverted conoidal vessel, mounted and rotating, and having a bottom aperture submerged in a liquid, and in an annular water wheel mounted above, and adapted to be rotated by the liquid thrown from the top of the conoid. The object of the invention is to elevate water for any suitable purpose, and by this operation to acquire power to whatever degree and for whatever purpose may be found practical.

WINE AND CIDER PRESS.—Henry Tyack, Grass Valley. No. 290,653. Dated Dec. 18, 1883. The improvements covered by this patent consist in various matters of construction, including principally the construction of the body or frame, and means for operating it. The following are means for operating it: The trays for catching the juice, the doors for discharging the cheese or waste, the means for opening the feed door, and a device for previously preparing or pulverizing the material. Each of the improvements has in view the general result of providing a more effective press.

BOX-COVER ATTACHMENT.—Belle Miriam Sahlein, S. F. No. 290,481. Dated Dec. 18, 1883. This is an attachment for the covers of such boxes as are mainly employed to hold hosiery and fancy small articles. It consists in a box having strips of tape, one end of which is secured to the inside front of the cover, while the other ends are secured to the inside of the box opposite, so that when the cover is in place the tapes will extend across from one side to the other. With this arrangement, box-covers cannot be misplaced.

POTATO DIGGER.—August Adam, Reno, Nev. No. 290,305. Dated Dec. 18, 1883. These improvements consist in means for driving the sifters or rakes with a positive motion, in means for adjusting the sifters, and in means for inclosing the gearing. The operation of the implement is as follows: The plow digs out the potatoes, the side runners throw them up to the sifters, which clear the earth away from them, and the cloth gathers them and prevents them from scattering. The revolution of the sifters is positive and certain.

HARNESS CHECK-HOOK.—A. C. Dietz, S. F. No. 288,696. Dated Nov. 20, 1883. This invention relates to harness check-hooks, in which is employed a wide, open ring slipping loosely through a hole in the thickened front end of the check hook, which allows the light of any strap or check-rein to be introduced, and when it is in place it is allowed to move freely through the ring and hook as the horse moves his head from side to side. The rein can not be disengaged accidentally from the check-hook.

Passing Events.

The new year was ushered in by a characteristically splendid California day, followed on the next by one of clouds and rain, perhaps more universally welcomed. The outlook for the new year is in every way favorable, and California expects that 1884 will be one of great prosperity to her thriving and progressive communities.

Men continue to push their way into the Cœur d'Alene country, notwithstanding the severity of the climate and the many difficulties to overcome. Nothing can be done there this winter, but they seem to want to be on hand by early spring.

The prospecting "boom" along the side of Mt. Davidson, which we have before noted, is one of the peculiarities of this region. A tract long neglected is now being carefully prospected, and it would be strange if the miners should open up a group of claims which would again put life and activity into the neighboring mining cities.

MILL BURNED.—A dispatch, dated January 2d, from Auburn, Placer county, says: The mill at the Belmont quartz mine, completed about a year ago at a cost of between \$30,000 and \$40,000, and one of the finest and best equipped quartz mills in this part of the State, was destroyed by fire about seven o'clock last evening.

T. F. ROWLAND, Brooklyn, New York, sole manufacturer of "Duc's Mechanical Atomizer or Pulverizer," has had erected for some time on his works one of them, which has pulverized from seven to ten tons of phosphate rock, etc., in ten hours, with thirty horse-power.

CALENDAR.

1884	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	1884	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Jan.	1	2	3	4	5	6	7	July	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	18	19	20	21	22	23	24	25
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8
Feb.	1	2	3	4	5	6	7	Aug.	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8
Mar.	1	2	3	4	5	6	7	Sept.	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8
Apr.	1	2	3	4	5	6	7	Oct.	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8
May	1	2	3	4	5	6	7	Nov.	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8
June	1	2	3	4	5	6	7	Dec.	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
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24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8

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ASSESSMENTS.

COMPANY	LOCATION	NO. AMT. LEVIED	DELINQ'T SALE	SECRETARY	PLACE OF BUSINESS	
Andes S M Co.	Nevada	23.	25. Nov. 10.	Dec. 20.	Jan. 9. B Barrie.	369 Montgomery st
Antimian M & M Co.	California	1.	2. Dec. 22.	Jan. 29.	Feb. 18. J M Huntington.	399 California st
Audm M Co	California	7.	8. Dec. 22.	Jan. 29.	Feb. 18. J M Huntington.	399 California st
Baker Divide M Co	California	8.	20. Dec. 5.	Jan. 7.	Jan. 28. W G Hughes.	330 Pine st
Boston M Co	California	5.	25. Nov. 21.	Dec. 21.	Jan. 30. Feb. 24. W S Sisson.	309 Montgomery st
Bodie Con M Co	California	4.	50. Dec. 21.	Jan. 30.	Feb. 19. W S Sisson.	309 Montgomery st
Bullion M Co	Nevada	28.	20. Nov. 16.	Dec. 18.	Jan. 7. J N Brazell.	320 Montgomery st
Copperopolis M Co.	Arizona	1.	5. Jan. 2.	Feb. 6.	Feb. 25. J H Sayre.	330 Pine st
Caledonia M Co	Dakota	14.	10. Oct. 31.	Dec. 13.	Jan. 11. W L Oliver.	328 Montgomery st
Day S M Co	Nevada	14.	30. Dec. 1.	Jan. 7.	Feb. 5. E M Hall.	325 Pine st
Eastern Quicksilver M Co.	California	2.	10. Dec. 7.	Jan. 15.	Feb. 4. F A Berlin.	420 Montgomery st
El Dorado Con M Co.	Nevada	1.	05. Dec. 4.	Jan. 7.	Jan. 23. J H Sayre.	330 Pine st
Eureka Tunnel Co.	Nevada	2.	50. Nov. 9.	Dec. 10.	Jan. 11. J J Parly.	Eureka, Nevada.
Goldfield Fleece G M Co.	California	31.	— Dec. 12.	Jan. 16.	Feb. 4. F Schmittner.	753 Folsom st
Gold Lead M Co	Nevada	4.	50. Nov. 9.	Dec. 17.	Jan. 8. J Braun.	325 Montgomery st
Hale & Norcross M Co.	Nevada	79.	50. Nov. 17.	Dec. 21.	Jan. 14. J F Lightner.	309 Montgomery st
Holmes M Co	Nevada	8.	1.00. Dec. 26.	Jan. 29.	Feb. 19. C T Bridge.	224 California st
Independence M Co	Nevada	12.	20. Dec. 1.	Jan. 4.	Jan. 28. J W Pew.	310 Pine st
Jupiler Deep Blue Gravel M Co.	Cal.	1.	1.00. Dec. 17.	Feb. 16.	Apr. 4. G L Laid.	426 California st
Loreto M & M Co.	Mexico	5.	50. Dec. 5.	Jan. 12.	Jan. 24. H G Jones.	327 Pine st
Massachusetts Con M Co.	California	1.	10. Dec. 4.	Jan. 12.	Jan. 31. A C Hammond.	Merchants Ex.
Mexican G M Co.	Nevada	25.	50. Dec. 26.	Jan. 38.	Feb. 20. E Elliott.	309 Montgomery st
Martha White M Co.	Nevada	17.	25. Dec. 24.	Feb. 7.	Mar. 7. J J Sewell.	309 Montgomery st
Mayflower Gravel M Co.	California	2.	10. Nov. 26.	Dec. 27.	Jan. 15. J J Parly.	325 Montgomery st
Northern Belle	Nevada	1.	50. Nov. 30.	Jan. 1.	Jan. 28. W Willis.	309 Montgomery st
Original Keystone Con M Co.	Nevada	7.	30. Nov. 21.	Dec. 22.	Jan. 10. F F Luty.	330 Pine st
Pinal Con M Co.	Arizona	5.	10. Dec. 15.	Jan. 23.	Feb. 15. A Adler.	309 Montgomery st
Santa Anita M Co.	California	6.	1. Dec. 22.	Jan. 29.	Feb. 18. J M Huntington.	399 California st
Tahoe M Co	California	1.	30. Dec. 18.	Jan. 23.	Feb. 16. J L Fields.	330 Pine st
Wide Awake M Co.	Arizona	17.	20. Nov. 17.	Dec. 28.	Jan. 28. C Hildebrandt.	320 Sansome st

MEETINGS TO BE HELD.

NAME OF COMPANY	LOCATION	SECRETARY	OFFICE IN S. F.	MEETING	DATE
Argentina M. Co.	Nevada	E. M. Hall	327 Pine st.	Annual	Jan. 14
Bryant M. Co.	Alaska	G. W. Reynolds	609 Sacramento st.	Annual	Jan. 12
Bullion M. Co.	Nevada	J. M. Brazell	328 Montgomery st.	Annual	Jan. 10
Con Virginia M. Co.	Nevada	A. W. Havens	309 Montgomery st.	Annual	Jan. 10
Crater M. Co.	Alaska	C. P. Gordon	309 Montgomery st.	Annual	Jan. 16
General Miller M. Co.	Alaska	G. W. Reynolds	609 Sacramento st.	Annual	Jan. 12
Iowa M. Co.	California	C. C. Leavitt	510 Battery st.	Annual	Jan. 8
Jeanette M. Co.	Alaska	G. W. Reynolds	609 Sacramento st.	Annual	Jan. 12
Janetown M. Co.	Alaska	G. W. Reynolds	609 Sacramento st.	Annual	Jan. 12
Mayfield M. Co.	Alaska	G. W. Reynolds	609 Sacramento st.	Annual	Jan. 12
Mountain M. Co.	Nevada	B. E. Heurickson	213 Mission st.	Annual	Jan. 7
Sierra Nevada M. Co.	Nevada	E. L. Parker	339 Montgomery st.	Annual	Jan. 16
Silver King M. Co.	Arizona	J. Nash	328 Montgomery st.	Annual	Jan. 8

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY	LOCATION	SECRETARY	OFFICE IN S. F.	AMOUNT	PAYABLE
Contention Con. M. Co.	Arizona	D. C. Bates	409 Montgomery st.	25	Dec. 24
Idaho M. Co.	California	—	—	4.00	Dec. 2
Kentucky M. Co.	Nevada	J. W. Pew	310 Pine st.	10	Dec. 19
Mc Diablo M. Co.	Nevada	B. W. Heatley	318 Pine st.	25	Dec. 26
Standard Con. M. Co.	California	Wm. Willis	309 Montgomery st.	25	Jan. 12
Silver King M. Co.	Arizona	J. Nash	315 California st.	25	Dec. 15

Mining Share Market.

Saturday being a half holiday, and Monday and Tuesday whole ones, broke up the stock business so much during the week under review that there is little to report. The market has been fairly active for a day or two; there is no special excitement to note. The northeast drift in the Sierra Nevada has got fairly started. The main south drift on the 3700 level of the Union Consolidated is making good progress. It is now thought that the main ore deposit lies to the west of this drift. Owing to the accident to the Cornish pump at the Combination shaft, operations in the middle mines received a setback of several days. Now, however, all work is going forward again in good shape. The new hydraulic pump is expected to do wonders shortly. The Imperial west drift is about entering the old levels, when miners will be put to work at exploring for ore in that mine and in the Alpha and Exchequer. Little is being done in the way of extracting ore in the Yellow Jacket, Crown Point and other Gold Hill mines at present, but it is hoped that there may soon be a better stage of water in the Carson river. When the mills can run to their full capacity, a force of men can be put to work in the mines. At the Alta the 2150 level—the lowest in the mine—is drained, and they are now preparing to resume active operations.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Bullion Shipments.

'Alice, Dec. 22d, \$13,482; Vienna, 22d, \$11,507; Ontario, 22d, \$3,894; Bullionville, 22d, \$19,038; Horn Silver, 22d, \$9,000; Hanauer, 23d, \$4,946; Ontario, 23d, \$46,489; Horn Silver, 23d, \$9,000; Hanauer, 25th, \$4,850; Alice, 25th, \$7,461; Vienna, 25th, \$6,086; Ontario, 25th, \$7,461; Horn Silver, 25th, \$18,000; Ontario, 27th, \$10,850; Horn Silver, 27th, \$12,000; Crescent, 27th, \$3,278; Stormont, 27th, \$3,056; Hanauer, 27th, \$4,709; Crescent, 28th, \$4,705; Hanauer, 28th, \$4,000; Ontario, 28th, \$4,126; Vienna, 28th, \$4,570; Tintic, 28th, \$4,180; Horn Silver, 28th, \$12,000; Hanauer, 29th, \$2,031; Paradise Valley, 22d, \$4,416.

If you want a Lubricant that will run any thing cool write CHARLES J. WOODBURY, GENERAL MANAGER LUBRICATING DEPARTMENT CONTINENTAL OIL AND TRANS. CO., for "Lubric." It is the best compound-grease in the market. Shipped in 5, 10 and 25-pound cans, half barrels and barrels. Warranted to give satisfaction. Observe the numbers: No. 2 is soft for outside work; No. 3 is medium soft; No. 4 is medium hard; No. 5 is very hard, where unusual lubrication is demanded. Send for Catalogue of Lubricating Oils.

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Wants a steady situation. Is thoroughly competent. Has the best of recommendation where he has worked in Oakland. Address LOUIS KREISS, No. 468 Third street, Oakland. Refers to PHILIP ROHRBAUER, proprietor at U. S. Brewery, N. E. cor. Franklin and McAllister Sts., San Francisco.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Jan. 3, 1884

ANTIMONY—Per pound	14	15
IRON—American Pig, soft, 60	30	40
Scotch Pig, ton	24	00 62 50
American White Pig, ton	28	00 63 50
Copper Pig, ton	32	00 35 60
Refined Bar, ton	30	00 31
Horseshoes, keg	5	50 00
Nail Rod, 7 ft	7	00
Norway, according to thickness	6	00 7
English Cast, lb.	14	00 15
Black Diamond, ordinary sizes	14	00
Drill	15	00 16
Machinery	12	00 14
Copper—Ingot	22	00
Braziers sizes	31	00
Fire-brick sheets	31	00
Nails	17	00
Holt	31	00
Old	8	00
Refract, 100 lbs.	12	00
LEAD—Pig	4	00 41
Bar	5	00 6
Pipe	7	00
Sheet	7	00
Shot, discount 10 on 500 bags; Drop, 2 bag	2	10 00
Buck, 2 bag	2	30 00
Chilled, do.	2	50 00
TRIP PLATES—Charcoal	6	00 60 50
Coke	5	00 5 75
Bacon, Tin	24	00
Australian	21	50 00
1 C. Charcoal 140 lb. 14x20	6	50 00 60
24x20—By the cask	19	00
Sheet, 7 1/2 to 10 lb. less the cask	9	00 10
NAILS—Assorted sizes	3	30 00 4 75
QUICKSILVER—By the flask	34	00 34 1/2
Flasks, new	1	05 00
Flasks, old	85	00

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto washed with aquaria is constantly receiving additions of new fish and other marine life. The number of sea lions is increasing, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, January 2, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 03, of twenty-five cents (25c) per share, was declared, payable on SATURDAY, January 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.

OFFICE—Room No. 20, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

DIVIDEND NOTICE.

SAN FRANCISCO SAVINGS UNION,

532 California St., cor. Webb.

For the half year ending with December 31, 1883, a dividend has been declared at the rate of four and thirty-two one hundredths (4 32-100) per cent. per annum on term deposits, and three and six tenths (3 6-10) per cent. per annum on ordinary deposits, free of taxes, payable on and after January 2, 1884.

LOVELL WHITE, Cashier.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending December 31, 1883, the Board of Directors of the German Savings and Loan Society has declared a dividend on Term Deposits at the rate of four and thirty-two one hundredths (4 32-100) per cent. per annum, and on Ordinary Deposits at the rate of three and six tenths (3 6-10) per cent. per annum, payable on and after the 2nd day of January, 1884. By order,

GEO. LETTIE, Secretary.

San Francisco Pioneer Screen Works.

J. W. QUICK, MANUFACTURER.

Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to any SLOOT CUT and SLOOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the Coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

32 Fremont Street, San Francisco.

Job Press for Sale or Exchange.

We have just received a new improved Rotary Job Printing Press of approved style and make, which we will sell at bargainable prices on favorable terms for a Washington hand press. Size of chase inside 7x10 inches.

Dewey & Co., Publishers.

New Book on Assaying Gold & Silver Ores.

By C. H. AARON.

For Practical Workers. \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

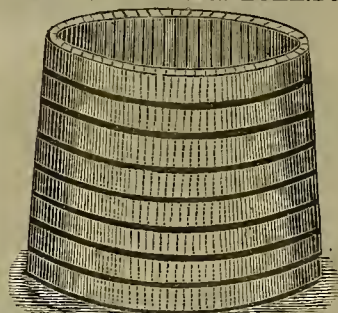
Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scourification; Cupellation; Weighing the Beal; Parting; Calculating the Assay; Assay of Ore Containing Course Metal; Assay of Roasted Ore for Solubility; To Assay a Charge; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 1/2 pages, with illustrations, well bound in cloth. Price, \$1; postpaid, \$1.10. Sold by DEWEY & CO., Publishers, No. 252 Market street, San Francisco.

N. B.—This is Part I of three volumes on assaying by the same author. To be followed by Part II—Gold and Silver; Part III—Lead, Copper, Tin, Mercury. A majority of the best mining publications yet printed have been issued by and are for sale by DEWEY & CO., publishers of the MINING AND SCIENTIFIC PRESS, S. F.

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NOTICE OF ASSESSMENT.

The Land Purchasers' Association.—Lo-

cation of principal place of business, San Francisco, Cal. NOTICE IS HEREBY GIVEN, that at a meeting of the Board of Directors, or Trustees, held on the 5th day of December, 1883, an assessment of five dollars (\$5.00) per share (being balance of 44th and part of 45th installments) was levied upon the capital stock of this corporation, payable immediately to the Secretary at the office of the Company, 318 Montgomery St., San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 7th day of January, 1884, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 12th day of February, 1884, to pay the delinquent assessment, together with cost of advertising and expenses of sale. By order of the Board of Directors,

EDWARD P. GRAY, Secretary.

OFFICE—318 Montgomery St., San Francisco, Cal.

N. B.—This Assessment is to pay the taxes on the Association property for the current year.

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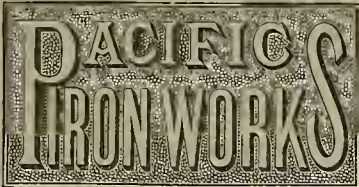
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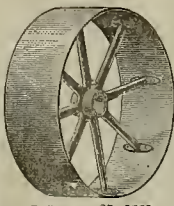
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STEAM VESSELS, of all kinds, built complete with Hulls of Wood, Iron or Composite.

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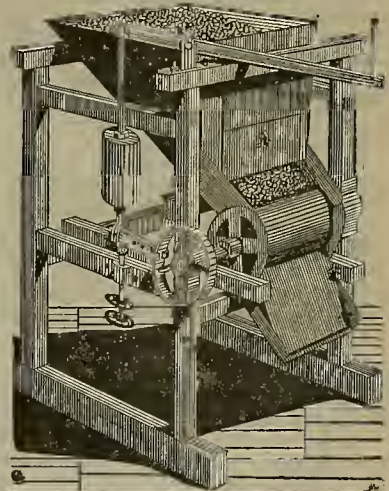
HYDRAULIC RIVETING. Boiler Work and Water Pipe made by this establishment, riveted by Hydraulic Riveting Machinery, that quality of work being far superior to hand work.

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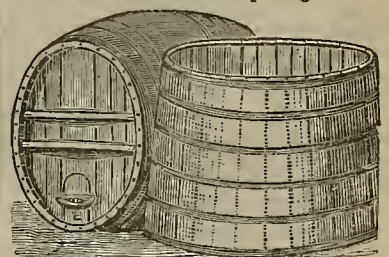


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In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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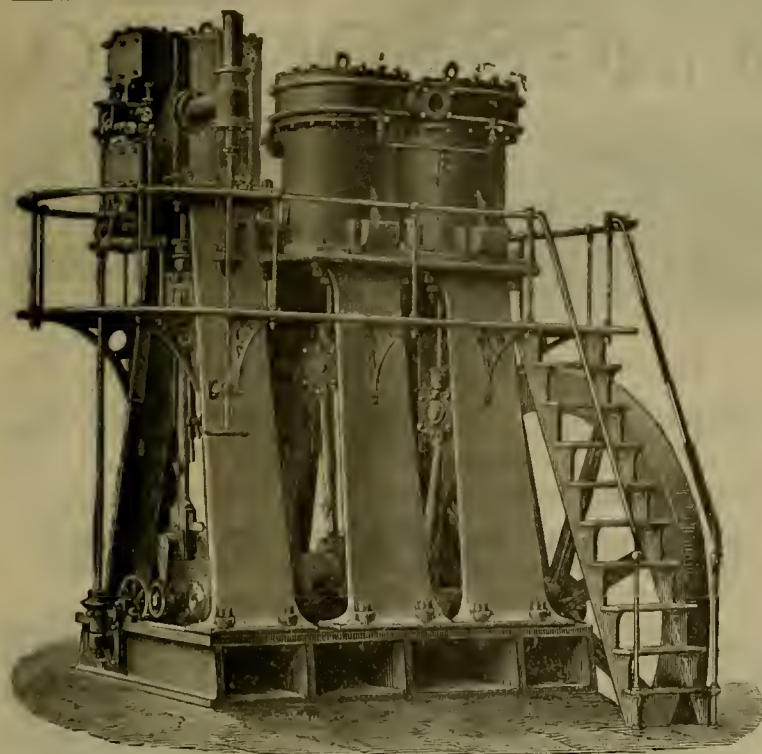
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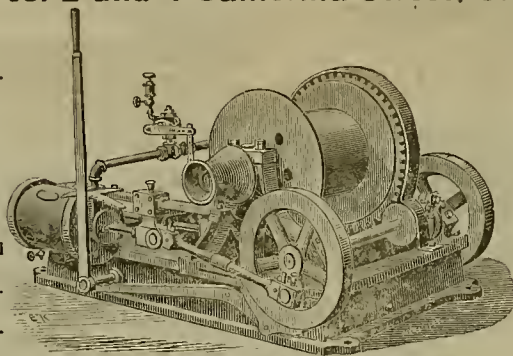
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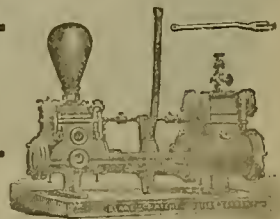
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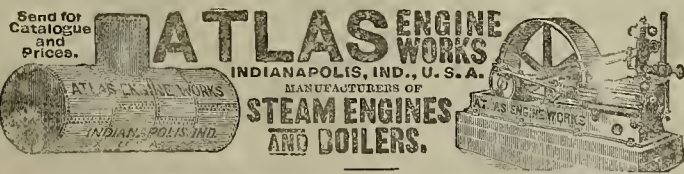
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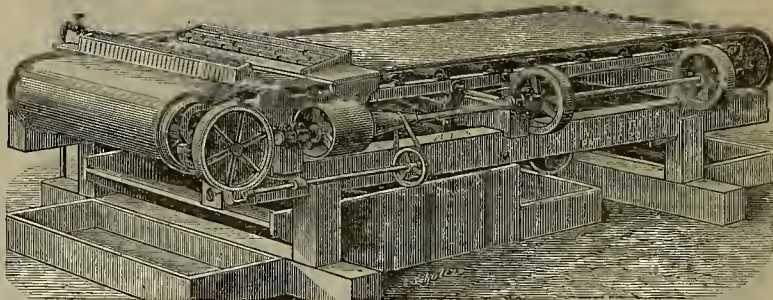
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That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machines infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

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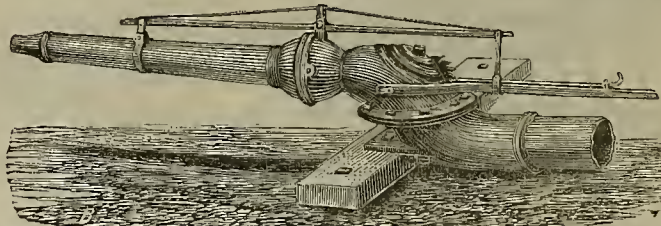
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SAN FRANCISCO, SATURDAY, JANUARY 12, 1884.

VOLUME XLVIII
Number 2.

Chisholm's Improved Saw-Mills.

On this page is represented one of the improved saw-mills for which P. McG. Chisholm received a patent through the MINING AND SCIENTIFIC PRESS Patent Agency, and which received the first premium at the late fair of the Mechanics' Institute. The log is set with ease and accuracy either by hand or power. In the set works some of the advantages are: First, the head blocks or bearers correspond with the side supports and are close together; second, the setting mechanism enables the sawyer to shift the cant forward, if necessary, with accuracy and dispatch; third, the device for drawing back the uprights and set beam rapidly and easily before putting on a fresh log; fourth, the slide or set beam with its numerous attachments for receiving cants and logs of all descriptions. The carriage is run by means of a steel wire

favorable conditions, the maximum figures given above may be considerably exceeded.

The horizontal and side rests for the logs being placed at intervals of three feet to four feet for the whole length of the set works, obviates the necessity of moving the head-blocks when changing from a long log to a short one. The mills will saw a four, twelve or forty-foot log on the same carriage without making the slightest change. While the variations just named are unusual, it is a common thing for logs to vary from ten to twenty feet long, necessitating, with ordinary mills, considerable extra work in setting, or else loss of time and labor in changing the position of head-blocks. The frequent side-rests also have the advantage of insuring evenly sawed boards at the very last of every cant.

Near the end and at intermediate points in the long set works are adjustable side bearings,

patented adjustable boxes, and is properly lined with the best metal. The collars are finished with the utmost exactness, so as to insure the continued trueness of saw-plate when hung on the mandrel. Sufficient length of arbor is allowed for interchange of drive and feed pulleys, so as to run main belt outside of frame when desired.

As to feed works, the movement of the carriage is controlled by a single lever. Belting from saw arbor over differential or cone pulleys allows of three changes of feed; the friction pulley is made to revolve outside of the large flange pulley on feed shaft. Throwing the handle forward tightens a loose belt running over flange pulleys and gigs back the carriage. The saw guide can be used for either top or bottom saws, right or left hand, and is easily adjusted, the sawyer being in no danger while adjusting. In changing saws, the jaws of the guide are

Mining Not Stopped.

It must not be supposed because the debris case has been decided against the miners that mining is to cease in California by any means. It only means the hydraulic mines, and not all of them; for there are some in some parts of the State that can run a long time yet. The quartz mines, which employ the bulk of the miners, will continue to be worked, and indeed quartz mining will be more closely looked to and the industry widened, for many mining men will turn their attention to it who have been engaged in the hydraulic branch. Hydraulic mines employ comparatively few miners. As far as actual labor is concerned, one big quartz mine wants more miners than a dozen gravel mines.

The mining interests of the State have received a set back by the debris decision, and



CHISHOLM'S IMPROVED PATENT LEVER-SET CIRCULAR SAW-MILL.

rope, which winds around a grooved pulley, and over shive wheels at each end of the track, the ends being fastened near the center of the carriage, thus allowing the carriage to run one-third of its length over the end of the track. This improved method insures smooth and rapid motion of the carriage, and is a great improvement over the old rack and pinion. The spreader wheel or splitter is made thinner in the middle than near the edge, and therefore acts more quickly than other splitters, while the friction is much lessened. The roll is large and revolves on the shaft of the splitter plate. Nearly touching the saw, and opposite the same, are rolls to hold short pieces as they drop from the saw. No splinters or bits of bark can wedge against the saw plate. The shape of the rolls prevents such an occurrence, while it frequently causes annoyance in mills fitted with the ordinary bearers in frame.

The capacity of No. 1 mill, with 48-inch saw, is from 10,000 to 15,000 feet per day, of ten hours; No. 2, with 56-inch saw, from 15,000 to 20,000 feet per day; No. 3, with double circular saw, from 25,000 to 35,000 feet per day. Under

for throwing forward the small end of logs independently of each other. These are operated by a simple lever movement, so arranged that when the retaining pawl is lifted, the projecting center slide is drawn back even with the line of uprights by the falling of the lever. The taper slide is thrown forward a little in advance of the upright, and nothing more convenient and simple could well be devised for the purpose. If so desired the carriage, can be built in sections, for convenience of shipping. When an under frame is not desired the makers furnish stands and rolls to go in floor. The rolls are turned to run true, and the groove in rack castings is placed to fit the circumference of rolls, insuring a smooth and even motion of carriage past the saw. A great advantage of the rolls is that there is no chance for sawdust or pieces of bark to affect the movement of the carriage and saw cant. The stands that carry the rolls may be set on a level with the mill floor.

The mill frames are made in the most thorough manner, and are sufficiently heavy to keep all attachments in place. The arbor runs in

turned back and the saw comes off without loosening bolts or nuts. This cannot be done by any other saw guide, and is a great saving in time where saws are taken off arbor to file, etc.

The No. 1 mill is so constructed that it can be taken apart and packed anywhere over the mountains to mining regions, on pack animals, being built in sections and properly connected by rods and dowels. The wooden saw frame need have no piece to exceed six feet long, and the heaviest piece, being the friction wheel, only weighs 95 pounds. The entire mill, with wood saw frame, weighs 3,000 pounds; No. 2 mill weighs about 4,000; No. 3 mill, about 6,000 pounds. The mills are made by Chisholm & Russell, No. 429 Fourth street, S. F.

Messrs. Whitney & Marshall, of Nos. 22 and 24 Fremont street, in this city, the sole agents, keep one of these mills set up and running at their factory, and invite all persons interested to call and examine it for themselves.

A BILL has been introduced in the Virginia Legislature to prohibit the running of railroad trains on Sunday.

the bullion product of 1884 will be materially decreased. But more attention is being paid to quartz and drift mining, and more yet will be from this on. It is to be hoped, therefore, that this, with the opening of new regions in the southern part of the State, will ultimately bring our bullion product up to its old standard. At all events, California will continue to be a leading mining State. Although this blow falls heavily on many persons it is better not to consider it as an insurmountable obstacle to progress. The subject need not be considered too hastily, for it is as well to make the best of what is an unprecedented and most unfortunate occurrence. From the first it was seen to be a matter that the courts must settle, and now that the decision has come, while the decree must be complied with, wisdom indicates that the most must be made of such resources as remain within our reach.

Work on terminal facilities in Portland and Albina, and on the Oregon and California extension, still goes ahead, and no orders to stop are expected.

CORRESPONDENCE.

San Francisco and Pine Grove Mining Districts.

[Written for the Press.]

On the high dividing ridge between the Beaver valley and the Wah-Wab valley, in Beaver county, Utah, is a short range running north and south, called the San Francisco mountains, having three principal summits, differing more or less in outline and appearance, and entirely distinct in their age and character. Their altitude is medium; that is, not great. The one farthest to the south is called Grampian; this is the lowest of the three and rises about 1,000 feet above the valley. The Grampian mountains consist of stratified sedimentary rocks, which is quartzite and limestone, the middle one being granite, and the highest and northernmost of these three summits is composed of trachytes of volcanic origin. These sedimentary rocks were originally deposited under water in horizontal beds or alternating strata of sandstone and limestone, which were transformed by great heat and enormous pressure, the sandstone to vitreous sandstone or quartzite, and the limestone to dolomite marbles. This whole formation was subsequently rent asunder, one part being raised up and tilted back by powerful volcanic agencies, thus forming the mountains as we observe them and as they appear to us at present—its eastern face presenting a cross section of these strata, 1,000 feet thick, and now dipping westward into the mountain at an angle of inclination of about twenty degrees below the horizontal. That portion of the formation from which this mountain was detached either remains in its original horizontal position or sank down and was subsequently covered with the trachytes that flowed over it, and against the eastern base of the granite mountains, and the eastern and southern base of the Grampian mountains, and now forms a sort of undulating, waving plains, extending some distance eastward. The quartzite and dolomite are in contact with the granite on the north, on a line running nearly east and west, and also in contact with the trachytes on the east and the south side of the mountain. The mines are in the latter contact at the eastern base of the Grampian mountain, the foot-wall being massive layers on beds of quartzite and dolomite, and the hanging-wall trachyte, and in the center of a great mineral belt or district. The veins or lodes are distinctly traceable over the surface along the entire eastern base of the Grampian mountain to the granite on the north, a distance of about one mile and a half, the course of the veins or lodes being north ten degrees, west and south ten degrees east magnetic. The mines are at the very center or focus of this great upheaval, where all the geological evidences point to a continuance down to the deep. Adjoining the Grampian mountain on the north is another, somewhat higher and quite different in appearance, character and age, being formed of granite. Beyond this, as mentioned above, another which is the highest of the three, entirely distinct in aspect, character and formation, consisting of a pale, purple trachyte, at one time a molten and liquid, purely volcanic product.

The flow of trachyte extended along the eastern base of the above described mountains, forming more or less of a plain, and although the surface is now mostly covered with drift the trachyte appears in place at several points and forms a distinct wall to the south. We have thus a contact between the trachyte and the granite, succeeded by a contact between trachyte and metamorphosed sediments—quartzite and dolomite marbles—and in this contact occurs the bonanza, or hornsilver. All of these "contacts," if thoroughly prospected will, without doubt, produce many more bonanzas equal in value to the now renowned Hornsilver. The town of Frisco, a mile easterly of the mines, is built on an extinct crater filled with volcanic ashes and tufa. It is evident that this crater was once the valve through which the volcanic forces came directly to the surface from below through the great fissure made by the break in the limestone and quartzite. This fissure, following the contacts, forms the veins or lodes. The principal veins of San Francisco district are: The Hornsilver, which is the original location on the main lode, having several extensions north and south; Carhouate, Cove and Cove Extension; Comet, Cactus, Cyprus, Colburn, Americus, Antwerp, Bonanza, Bradshaw, Dolly Mack, Dexter, Dives, Florida, Grampian, Governor, Great Republic, Hoodoo, Jay Hawker, Tulea, Morning Star, Massachusetts, Morrison, Niagara, New Haven, Quartzite, Rosa, Rattler, Sherman, Silverapolis, Summit, Hope, Triangle, Vanderbilt, Woollett and Young America.

As it would take too much space and time to describe all of the above mines, I will here confine myself to the leader, the "Hornsilver." The vein is traceable for several miles, from the southeastern end of the Grampian mountain to the point where the dolomite gives place to granite. The width of the vein at the Hornsilver discovery is from forty to sixty feet, showing galena in places all throughout the length of the claim. The vein dips north eighty degrees east magnetic at an angle of inclination of about seventy degrees from the horizontal. The footwall of the lode consists of

quartzite and limestone beds, and the hanging-wall of partially decomposed trachytic material. From these facts it will readily be seen that the dip and also the strike must vary at different points, especially there where the softer parts—the dolomite—are more readily decomposed and eroded than the quartzite. Therefore the width of the lode varies in places. Both walls are covered with a dry ferruginous clay which serves as an indicator of the lode and the walls thereof. The hanging-wall of said lode has been penetrated for a distance of 200 feet or more. The following material is thereby disclosed: Adjoining these are twenty to twenty-five feet of clay, stained with oxide of iron, then thirty feet of tough blue clay merging gradually into a decomposed trachytic mass of a reddish gray color. The lode itself contains in its enormous vein fissure two general classes of material. The larger portion is what is termed smelting ore; this is soft and earthy, consisting of sulphate, oxide and carbonate of lead, carrying silver. The smaller portion is heavy spar (sulphate of baryta), carrying chloride of silver, sulphate of silver and ruby silver. The sparry ore is found on the side of the hanging wall in the upper part of the vein and has resisted decomposition on account of its position in the lode, and on account of the refractory nature of the material composing this kind of ore. All the other ore of this immense vein has undergone oxidation and other changes. There is no doubt, but as depth is gained, the ore will be found in its original condition—that is, in the form of sulphurets. Remarkable is the absence of wall material, so-called "horse," in the vein filling. All is ore from wall to wall, and silver bearing. This lode will remain dry to a considerable depth. Assay value of the ore is \$60 per ton; daily production, 100 to 150 tons of ore; net profits, \$20 per ton. The ore body contains 280,000 tons of ore in sight, representing a value of \$16,000,000. The amount of ore extracted up to date is 153,000 tons. Dividends paid in the past, up to date, amount to \$2,700,000.

W. BREDEMAYER, M. E.,
U. S. Surveyor.

Affairs in Mexico.

[Correspondence of the MINING AND SCIENTIFIC PRESS.]

The Yellow Fever and Its Effects.

With the disappearance of the yellow scourge that afflicted the inhabitants of Guaymas last summer, the business of the place, for a time much interrupted, has gradually revived, and is just now unusually active, with a prospect of so continuing throughout the coming winter at least. The malady, though a serious detriment to business and otherwise a great evil at the time, has not been without its advantages. Admonished by this new danger, the authorities of the town adopted a variety of sanitary measures, such as causing the streets to be cleaned, improving the drainage, purifying the more filthy localities, etc., precautions that hitherto had been wholly neglected, and which, once taken, must now result in much permanent good. Being so fortified against their approach, it is not likely that Guaymas will ever again suffer severely from contagious diseases of any kind, as the place is naturally healthful and there is little fear that these self-protecting efforts will soon be relaxed. Indeed, it is probable that this awakening of the good people here will lead to the adoption of other reformatory measures designed to promote the public health, further the interests of commerce, and otherwise benefit the place. This is a new departure for our Mexican brethren; not much have they been accustomed to act in concert for the public good. Hardly ever before have they been sufficiently aroused to combine their efforts for the accomplishment of social, sanitary or similar objects. Having shown so much enterprise on this occasion, further manifestations of public spirit may be looked for.

Concerning the Business of Mining Down Here.

A subject which most interests you Californians, there is this to be said. For mere speculative purposes it is dead enough, that branch of the business having been greatly overdone. As a field for productive operations Sonora is not surpassed, if equaled by any other country in the world. I have been over a great deal of it, and speak from actual observation, or rather, perhaps, I should say, actual knowledge. But with Californians in Luck.

A company of Californians are reported to have obtained a half interest in one of the most noted of the old mines of Sonora on condition of their freeing it from water and putting up a mill for working the ore. This mine, known as the Cueva Santa, is situated in the Santa Rosa District. As to the precise locality of this district I am not advised, though I believe it lies in a range of mountains running parallel with and to the west of the main Sierra Madre, which traverses the State centrally from north to south. This company is said to be made up of practical miners—men of energy and experience who will manage the business themselves, having money enough of the iron to rehabilitate the property and outfit it with a mill and hoisting works, the latter with pumping gear being already on the ground. Certain Eastern parties had been negotiating for this mine, but your Californians managed to get in ahead of them and secure the prize. The new owners having cleared the mine of water, found in the lower

workings an ore-bearing vein averaging more than a foot in thickness, every pound of which will yield at the rate of \$400 silver, and \$100 in gold per ton. There is absolutely no waste—such, at least, is the story that comes to us here. Making due allowance for the overstatement common in these cases there would appear to be a concentrated bonanza in this Cueva mine. A number of mining sharps have lately left Guaymas for the Santa Rosa District, which lies somewhere in the mountains in a southerly direction from the town of Altar.

The Wet Season

Set in here, as usual, in the month of September, since which heavy rains have fallen in the mountains of the interior, where the precipitation is greater than near the coast. The climate of Sonora does not differ much from that of Southern California, except that the rainfall is here much greater. Our summers throughout the *Tierra Caliente*—being the strips of country lying along the gulf of California—are long and hot. The summer heat elsewhere is modified by elevation, being never oppressive in the higher mountains, though the winters there are cold, with considerable snow. Snow never falls below an altitude of three or four thousand feet. In the *Tierra Caliente* frost is unknown, oranges, lemons and other semi-tropical fruits growing and maturing there the whole winter long. A sirocco blowing from the interior sometimes visits Guaymas so hot that both men and animals seek shelter from it. It seldom continues, however, for more than twenty-four hours at a time. Though the heat here abates after sundown, and is never of the sultry, stifling kind experienced in the Atlantic States, the nights are not generally so cool as in California. In some parts of the interior a very uncomfortable degree of heat prevails throughout the entire twenty-four hours.

Guaymas, Sonora, Mexico, Dec. 15, 1883.

Systems of the Crucible Assay.*

In all the fire assays of gold and silver ores, the precious metals are collected by means of lead from which they are afterwards separated. In crucible assays the lead is produced from litharge by the action of reducers. The crucible assay is divided into two systems, either of which may be applied to any ore, but is best adapted to certain cases.

In the assay by the first system, more litharge is used than is requisite for the production of lead. The excess assists in fluxing the assay. All base metals, except the required lead, are oxidized and dissolved in the slag. This assay is quickly made, and generally gives accurate results. It has the disadvantage of requiring considerable modification of the various ores, as to the fluxes proper, and to the reducers or oxidizers by which the production of lead is controlled. Sometimes a preliminary assay is necessary.

In the assay by the second system, only enough litharge is used to furnish the required lead. All base metals except lead remain combined with sulphur, or, as arsenic and antimony, are volatilized, or combine with iron. This assay requires a longer time than the other, but presents the following advantages: The right quantity of lead may nearly always be got at once, for, although any lead which the ore may contain will inevitably come down together with that from the litharge used, yet this can be allowed for by reducing the quantity of litharge or omitting it. As litharge yields ninety-three per cent of lead, it is not difficult to make the adjustment nearly enough. Galena contains eighty-six per cent of lead, hence if the ore is nearly pure galena, but little litharge is needed. The method requires but slight modification for different ores, and may with little disadvantage be made universal. The hutton is never much contaminated by copper, as it often is in the other system unless a very large proportion of litharge is used, which is disadvantageous in some ways. The crucible is but little attacked, and the assay is not liable to boil over.

The method is especially useful for ores carrying much galena or other sulphuret, and when copper in any form is present. The writer has found it accurate for all ores, except one case of concentrated sulphurets containing gold and silver. All the gold was obtained, but scorification gave a little more silver. All crucible assays failed in this case, as also with an arsenical matte or speiss from a smelter, which also yielded only to scorification.

*From a practical work on "Assaying of Gold and Silver Ores," by Chas. A. Aaron, lately issued by Dewey & Co., S. F.

They have drained the water out of the lowest level—2150 feet—of the Alta mine, on the Comstock. The level is found to have sustained but little damage from the water with which it was so long flooded; indeed, it is in much better shape than it would have been had it stood exposed to the action of the air for the same length of time. It will not be much trouble to clean out the drifts, as they contain but little slime. It is found that most of the mud and slime is at and about the station. It is in the shape of drillings and other debris that went down the shaft. The east drift on the 2150 stands in almost perfect shape, while in the west drift are only a few spots where rock has tumbled in.

To Cheapen Mining Patents.

The White Pine *Cone* has taken up the discussion of this important subject. It is something that we have tried to call the attention of the mining press to, for the past year. It is a question that should be thoroughly canvassed and discussed. The *Cone* takes issue with our statement about extortion and robbery. We admit the expressions are harsh and rather far-fetched. But it appeared to us to be necessary to call attention to the wrongs and burdens of the prospector and miner. The *Cone* conveys the impression that it is hardly possible to cheapen the cost of patents except as far as the \$5 per acre goes. Now that \$5 is what we find the least fault with. It is the red tape necessary before the privilege of paying the government that \$5 per acre can be had.

We will start out with the assumption that the law for surveying mining claims is unjust. It is just as much the duty of the general government to survey the mining sections of the country as the agricultural portions. If the mining sections were sectionized and subdivided, the cost of surveying mining claims would be materially lessened. For instance, A has a claim. It is somewhere in the northwest quarter of section 2, T. 12 S., R. 86 west. A wishes to patent. He will have it surveyed, connecting the corners of his claim so many feet, in whatever direction it may be, to such quarter or section corners as are most accessible. He then takes or sends his plat to the Land Office, the Register designating the claim as No. —, on northwest quarter of Section 2, T. 12 S., R. 86 west. The claim may cross into different townships, sections or quarter-sections, which the plan will show, and all the Register will have to do is to number the applications and accord to them section or sections on which the discovery may be situated. The publication of intention to prove up and enter the claim can be made the same as is now required on agricultural land. After expiration of publication the owner of the claim takes his witnesses to the Land Office, makes proof of ownership, and the lawful improvements, pays for his claim and receives his patent the same as he would on an agricultural claim. By this plan all the unnecessary and cumbersome red tape machinery of asking for order of survey, posting notices, of employing attorneys and long, costly publications would be done away with. We would not have the present necessary \$500 worth of improvements reduced, but would rather, if a change is to be made, have it increased.

Here, Mr. *Cone*, is an imperfect plan to cheapen and improve the present cumbersome and costly mineral patent law. Others may suggest a better. No one can hardly suggest a worse law than the present, for almost any change that should be made would be for the better.

The Cœur d'Alene Placers.

A. E. Driggs, the well known express and stage man of this city, has returned from the Cœur d'Alenes. He confirms previous reports as to the extent and value of the new diggings and thinks the rush and excitement next spring will be unprecedented. He says the main travel into the gold fields must be from this side, on account of the swollen river which must be crossed over thirty miles by the Rathdrum route, and which will be impassable during the spring thaw. The Trout Creek route now appears to be the most feasible and will probably be the favorite trail. At present nothing is being packed into the mines. There is no grub there for sale and the miners who have camped there for the winter have laid in provisions only for their own use and will not sell at any price.—*Butte Miner*.

The latest description of the new mining region in the Cœur d'Alene mountains is this: Pritchard's gulch is 20 miles long and from 200 to 500 yards wide, the stream falling about 2 feet in 100. The slate crosses the stream at nearly right angles and the jagged slate makes natural riffles which have caught the gold. On Pritchard's gulch prospects have been found for 15 miles. The gold is worth \$16.50 per ounce. Eagle Creek is 10 miles long and from 200 to 500 yards wide. Good prospects are reported at the lower end. Beaver creek is 18 miles long. Some prospects have been found along this creek, but bedrock has not yet been found.—*Idaho Statesman*.

Such is the location of Eagle City, in the Cœur d'Alene mountains, that the sun does not shine upon it until 11 A. M., and then only for an hour, disappearing behind the mountains at noon.

The Pritchard creek (Cœur d'Alene) metropolis has 21 log cabins, in which 100 men and one woman are sheltered for the winter.

Pritchard gulch gold is worth \$18 an ounce, passing current at that figure in all commercial transactions.

Pritchard creek carries a large swift-flowing body of water, sufficient for all mining purposes, if claims should be located its entire length. The gulch is heavily timbered, many of the trees being from twelve to fourteen feet in circumference.

At Eagle City flour is worth 20 cents per pound; bacon 40 cents; sugar 75 cents; beans 40 cents; butter \$1.50; beef and venison 25 cents, with little to be had, and other necessities scarce and correspondingly high.

MECHANICAL PROGRESS.

The Cinder of Wrought Iron.

Special attention, says Professor Ledbur in *Stahl und Eisen*, translated in a recent issue of *Iron*, has justly been bestowed for years upon the determination of the carbon, manganese, silicon, etc., contained in malleable iron; but the determination of the cinder mixed with wrought iron has but rarely been the subject of investigation by chemists. And yet the quantity of cinder contained in iron affects its mechanical properties no less than many of the alloyed substances. Indeed, it may be affirmed that, at least in the wrought iron containing but small amounts of carbon—fibrous iron—silicon and manganese, where such are found, are not alloyed with the iron, but are merely present as constituents of the incorporated cinder. This cinder may not infrequently be observed in the fracture of iron, especially with the aid of a magnifying glass. If fibrous iron is splintered in the direction of the fiber, cinder may often be seen very plainly between the fibers. A more complete evidence of the presence of cinder in wrought iron is obtained if the fracture is polished and treated in the well-known manner with strong acids. In the places where cinder is present, a depression or small pit is formed in the surface so treated. Ingot iron does not show this phenomenon; wrought steel and fine-grained iron display it proportionately less, but fibrous iron appears to be covered with these small holes. I explain their origin in the following manner:

Everywhere where a grain of cinder was mixed with the iron, it was not without chemical action upon its surroundings by the repeated and continuous heating of the iron. It may be assumed that such mechanically intermixed cinder is in all cases rich in peroxides of iron, and that those peroxides already, during prolonged heating in contact with iron containing carbon, act as an oxidizing agent upon its carbon. We need only be reminded of the process of manufacture of malleable castings.

All the conditions for such a process are present. In every case there is formed round the grain of cinder an iron less able to resist chemical influences. It is well known that, as the contents of carbon decreases, iron is rendered more liable to chemical action. If the fractured surface is, therefore, treated with acids, they penetrate, in the first place, between the splinters of the cinder and the iron. The former is dissolved or drops out, and the iron then offers a great surface to the attacks of the acid. The openings rapidly increase in size, and are then seen by the eye as the small pits mentioned above.

Unfortunately, there does not exist a simple method of determining the quantity of cinder contained in wrought iron, and the reliability of the various ways proposed up to present time is not entirely unquestioned. This may be the principal reason why as yet proportionately few determinations of cinder have been undertaken. Some have proposed to heat the iron to be examined in a current of chloric gas, when cinder remains, and the metallic iron, etc., are evaporated. Others apply a solution of bromine in bromide of potassium in order to dissolve the iron and to separate it from the cinder; yet others use ammoniacal chloride of copper. Professor Eggertz uses iodine in water, and during the solution of the iron cools the beaker containing the various elements in iced water. In all cases it is necessary, if the iron to be examined contains silicon in a non-oxidized state, to treat the residuum with soda solution in the water bath, in order to dissolve the silicic acid that may have been formed.

Some Curiosities of Steel.

Eight master taps, or hobs, were made from the same bar of four-inch steel, each cut to a pitch of three to the inch, each scored, heated, hardened and drawn to temper at the same time. Six hours after the tempering one of them "exploded," or at least cracked into three pieces with a report. The fractures give to the trained mechanical eye the appearance of good steel, and show no water cracks or other evidence of previous fracture. At the same establishment where this breaking occurred, one of its most important departments is the production of taps, reamers, dies, and similar tools. It has been abundantly proved that forged taps and reamers are inferior to those made direct from the sized commercial bar, not only in their resistance to torsion, but in the retention of their integrity under the exactions of hardening and tempering; the best taps are those which are turned direct from the bar.

There seems to be a tendency of forged steel, under certain forms, to return to the shape of the original bar. This is shown especially when the forging from a square bar is flattened. Sometimes a flattened piece will curve in the hardening as though its fibers had been stretched, and, when relaxed by the heat and again placed under tension by the cooling process, contracted toward the original condensed, square form. A singular example was noticed recently. A plug gauge two and five-eighths inches wide and one and three-sixteenths inches thick was forged from a square bar, finished and hardened. After hardening it was ground to exact size by a corundum wheel, when the

ground side immediately swelled in the center almost enough to be seen by the unaided eye, but was quite apparent with the straight edge. The other face, from which the skin of hardening had not been removed, remained straight, but as soon as that had been ground it acted just as the other did and both the side faces were swelled, and so much so that the increase in thickness by the micrometer gauge was more than one-hundredth of an inch.

On treating the edges a contrary result was produced; each edge face became concave, so that when the grinding was completed the plug had two opposite convex sides and two opposite concave edges. The plug was then annealed and redressed to truth; then rehardened and re-ground with the same results as at first. A second time it was annealed, trued and then case-hardened, but even then it continued its perversity, and it is to be kept as a curiosity as it is, unless it is decided to saw it in two and inspect its interior.

The most vexatious thing about these "quercities" is that no theory that bears the test of practice has, so far, accounted for them. If the "reason why" could be discovered, the causes could be removed and the working of steel be made an exact and certain art. Still, there has been great progress made in this direction during the last twenty years; the percentage of loss in hardening and tempering steel has been reduced to a very low figure. These improvements have been owing to the greater uniformity in the character of the steel produced as well as to the greater skill in its after manipulation. We may not despair of yet being able to make the production of hardened steel articles as even and certain as those from any other material.—*Scientific American*.

A NEW WELDING FLUX.—Jean Laffitte, of Paris, has obtained French and American patents for a new welding material. His claims are specified as follows: 1. A welding material composed of twenty-five parts, by weight, of borax, a paper or metallic support, and sixty parts of metallic filings of the same nature as the metals to be welded, and made by first melting the borax; second, immersing the support in the fused borax; third, smoothing the same by passing it through pressure rollers; fourth, sprinkling its two faces with the metal filings; fifth, heating the sheet in an oven, and sixth, passing through pressure rollers, as and for the purpose described. 2. A welding material composed of borax and of metallic filings of the same nature as the metals to be welded, mixed with the fused borax, and in the proportions substantially as set forth, and then rolled out into sheets of about one sixteenth of an inch thick, as and for the purposes described. 3. The welding sheets made as hereinabove described, and then coated with a layer of gum-lac or other appropriate varnish, as and for the purpose set forth.

HARDENING STEEL.—If a piece of steel be hardened and lifted from the water before it is cold, a crack or flaw may be the result. The reason is that the outer surface being very hard and the inside hot, expansion commences and a breakage of the hard chilled surface is the consequence. More tools are ruined by overheating, cold-hammering and over-tempering than can be redeemed by all the new recipes that have been invented. Use only steel that is good and suitable for the tools to be made, and stick to it. Find by a few trials the lowest heat that will harden it in pure water at seventy degrees, or ordinary shop temperature. If steel is hardened at the lowest heat, the temper will require drawing very little, i. e., to a pale straw, full straw or brownish-yellow, but not deeper unless for wood working tools with thin cutting edges, when a full brown may be desirable.—*Sewing Machine News*.

POLISH AND CASE HARDENING.—The finer the polish which is imparted to the surface in case hardening the better will be the results. The art is a very useful one, and should be thoroughly understood by every smith and worker in metal. The process is very simple. The articles are placed in some air-tight receptacle, generally an iron box, but often a pipe, which can be turned, and therefore admits of the more uniform application of heat. The receptacle is filled with coarse charcoal powder and exposed to a cherry-red heat for twenty-four hours. If a hard surface one-eighth of an inch is desired, but from four to five will be long enough to make a good surface of steel.—*Sewing Machine News*.

A NEW PROJECTILE.—Krupp has recently taken out a patent for a flat-headed projectile, which novel form was given to it with a view of preventing its gliding off on striking the armor plate of a vessel at a great angle of inclination. The form has further been adopted with the object of penetrating a ship's armor below the water line, an operation hitherto attended with but little success, owing to the pointed head of the shot. In order not to cause a loss of velocity, a point of wood or thin iron plate is attached, which, on striking, is immediately shattered, but, at the same time, being filled with oil, which is to "grease" the projectile, is said to increase its power of penetration.

CHILLING IRON.—Dr. Wedding points to the fact that when melted iron is allowed to chill the first crystals which form are nearly pure iron. He suggests that, by repeatedly crystallizing the iron, a metal of high character may be obtained from poor pig iron.

SCIENTIFIC PROGRESS.

Vegetable Evaporation—Impoverishment of Land.

M. Deherain, in his interesting discourses upon the exhaustion of the soil by cultivation, makes some statements that are striking and suggestive.

In speaking of the evaporation of water from the leaves of plants, he says that in one hour, exposed to the sun, a leaf of barley exhales a weight of water equal to its own; and calculating upon these figures, 2.5 English acres of maize will lose, under the same circumstances, 25 cubic meters of water. Hales, an English observer, has said that 2.5 English acres of cabbages lose, each day, 20 cubic meters of water; and Lawes and Gilbert, in their studies on this subject, proved that a plant which has formed one kilogramme of substance within itself has carried in circulation through its tissues 250 to 300 kilogrammes of water.

Humus or decayed vegetable matter, is the body which is most efficacious in retaining and keeping in a pure state the terrestrial waters. It can absorb an amount of water greater than its own weight, holds it more tenaciously than clay and infinitely better than sand. Analyses show that humus abounds in the prairies, or unused lands, and that it diminishes greatly in cultivated districts.

M. Boussingault found in a pasturage of Argentina, in a kilogramme of soil, 40 grammes of carbon belonging to organic matters, and only 28 and 24 in the same quantity of cultivated land. M. Trucot found 10, 12, 14, 18 grammes of carbon in the districts of Limagne and Auvergne, which were highly cultivated, while he reports 110, 120, 148 grammes in the prairie lands of the high mountains which were roamed over by cattle, but never received fertilizers. The reasons for this difference are not difficult to determine. In the unused fields the earth is not broken up or exposed to the oxidizing and destructive action of the air, and the decaying roots, sprays, and scapes of the grass or herbs constantly increase or maintain unchanged its percentage of humus.

M. Deherain has demonstrated the cause of this loss. He divided his experimental land into parcels and devoted many of them to a continuous cultivation. Some from 1875 to 1879 have borne potatoes, others corn, others each year, beets. In 1878 the land planted with maize, in one kilogramme contained 16, 15, 13 grammes of carbon; at the end of 1879, eighteen months later, the same weight of soil gave 14.4, 10.4, 13.1, 12.3, and at the end 1881 the amount had been reduced to 8.0, 7.6, 6.1 grammes of carbon per kilogramme of soil.

In 1879 he examined the land planted with beets and corn, having yielded three harvests of beets and one of corn, and found the quantity of organic substances oscillating around 13 grammes per kilogramme. He then sowed this ground with sainfoin, which remained undisturbed for three years and yielded excellent crops. At the end of the experiment he found the amount of carbon per kilogramme of soil had scarcely changed, being in fact 11.4, 13.0, 13.3, 12.8, 12.1, or a mean of 12.5, contrasting to great advantage with the reduced amounts in the harrowed and turned up grounds.

Apart from the reduction of organic matter in soils upon being turned up, the oxidation which removes the organic matter M. Deherain attributes to chemical change, by contact with air and to fermentation, but also largely to the activity of living organisms, plants and animals; for he observes, "The soil is not simply a mass, porous and inert, of clay, sand and humus, but rather a center of organic activity."

Although MM. Schlessing and Muntz have shown that the formation of carbonic anhydride goes on in a sterilized soil, it is yet probable that microscopic germs and other living occupants of the earth are the principal agents in its production ordinarily.

These inferior beings play an important role, and MM. Lawes, Gilbert, and Warrington have shown that the mushrooms, which at some seasons appear in such numbers, decompose and assimilate large quantities of the organic contents of soils. The well known "fairy circles" in fields are due to a luxuriant growth of grass following the disappearance of the mushrooms, which first formed them. These chemists found that outside of these circles the ground contained 3.30 per cent of combined carbon, while within and after the occupancy of the space by these parasites, the samples yielded 2.78 per cent. This difference corresponds to almost 9,000 kilogrammes of carbon to 1 hectare (2.5 English acres) of land.

TEMPERATURE OF THE SUN.—In a recent lecture on solar physics at the Royal Institution, Sir Wm. Siemens gave his reasons for setting the temperature of the photo-sphere of the sun at about 2,800 degrees C., instead of about 10,000 degrees, where Rosetti and other late investigators put it. He agrees, in this lower estimate, with Violle, St. Clair, Deville and Sir William Thompson, and thinks the solar temperature can not much, if at all, exceed that of the most powerful electric arcs. He recognizes fully the fact that a temperature higher than 3,000 degrees C. would be absolutely conclusive against his theory that the solar heat is due to the recombination or burning of compound gases at the surface of the sun. He

bases his estimate of the solar temperature upon three foundations: First, the behavior of a carbon rod and a small gas flame in the focus of a reflector exposed to the sun; second, on a comparison between the spectra of various lights—for instance, the Argand burner, an incandescent lamp, the electric arc, and the sun itself, as observed by Langley on Mount Whitney; third, upon experiments on the relation between radiating power, made by means of a long platinum wire heated by an electric current.

THE SUNSET COLORS.—The earthquake theory seems to be the prevailing one, among scientists, to account for the sunset colors which have been so remarkable for the last few weeks. A correspondent of the *Scientific American*, in supporting this theory, says: The forces there in operation—unparalleled, I believe, in all human history—were evidently adequate to such an effect, and the fact that immense quantities of something were thrown into the air is attested by the greenness of the sun as seen in India. Besides, the time since the Java earthquake has been just about what we might suppose sufficient for the dust to diffuse itself to this distance. Sixty-one tons of impalpable dust thrown into the air would allow one ounce to each tract of ten miles square over all the earth's surface. This, I think, would be quite sufficient when viewed at an oblique angle with the stratum containing it, and nearly in the direction of the sun, to be plainly visible. Having thus an adequate and probable cause, there seems to be no need of ascribing the phenomenon to any mysterious extramundane cause, of which we can know comparatively nothing, but of which we may imagine everything.

PHOTOGRAPHIC PROGRESS.—Photography is one of the miracles of modern times. The art has taken strides with seven league boots since the time of Daguerre, who made a picture on a metal plate, which had to be turned and twisted in every direction before you could find what you were looking after. Lately pictures have been taken with such rapidity that lightning is compelled to strike a faster gait to keep up with the process. Dr. Koch tells us that he has photographed with a photomicrographic camera that most minute filament, the flagellum of the bacteria. One might be satisfied with photographing the bacteria as a whole, since it is beyond the reach of naked vision; but to take a picture of an insignificant portion of it is like getting up among fairy tales. Mr. Rockwood, also, has succeeded in getting satisfactory pictures of the vibrating point in the diaphragm of a telephonic instrument while a person was speaking at it, and by means of a spark from Leyden jars. The work must have been done in the one twenty-four thousandth part of a second.

COMPENSATIVE HEAT EMPLOYED BY DIFFERENT LIGHTS.—The general knowledge that the electric light produces very little heat in proportion to its illuminating power has been reduced to figures by *Nature*, which gives the following result of careful experiments: The heat from an arc lamp of 100 candle-power is from 57 to 158 heat units, that of the incandescent lamp, of equal brilliancy, from 290 to 536. The Argand gas burner is the next best light in point of coolness, but this is represented by 4,860 heat units, a colza oil lamp by 6,800, a flat wick petroleum lamp by 7,200, a paraffine candle by 9,200, and a tallow candle by 9,700. Light for light, therefore, the heat of an electric arc lamp, under the most favorable circumstances, is to the heat of tallow candles as 1 to 170.

NATIONAL MUSEUM OF ENTOMOLOGY.—Prof. C. V. Riley, the entomologist of the Department of Agriculture, has deposited with the Smithsonian Institute his own private collection of insects, with the idea of using it as a nucleus for the development of a collection fitting the dignity of a national museum. The collection deposited comprises some 30,000 species and upward of 150,000 specimens of all orders. The most important addition to the Institute has been Mr. Ridgway's private collection of American birds, containing 2,302 specimens of 778 species, especially important because the specimens have been selected in field to illustrate variations of color and form due to age, sex and geographical location.

AGRICULTURAL VALUE OF ENTOMOLOGY.—For several years past the Swedish government employed an entomologist to assist the farmers in distinguishing and destroying insects that prove hurtful to the crops. The demand for his services has been so very great, and the work he has done has been so useful, that the office of Government Entomologist is to be made a permanent one.

SAND AND WATER.—Some of the conclusions of science would indeed be appalling but for their practical harmlessness. Thus geologists assert that if the continents and the bottom of the ocean were graded down to a uniform level the whole world would be covered with water a mile deep, so much greater is the depression of the ocean bed than the elevation of the existing land.

EXPERTS in chemistry have estimated that the cost of London's winter smoke and fog is \$25,000,000 annually; that is to say, constituents of coal to this value escape unconsumed, and assist in forming the sooty vapor.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ST. JULIAN.—*Sentinel*, Dec. 26: The excitement in the court house concerning the St. Julian quartz mine still continues. Except the payment of taxes business is practically suspended. Every one of the owners can be seen walking around with a piece of quartz in hand, which he tastes, washes, pounds, assays and dreams sweet dreams of countless wealth over. They have a ledge of very good looking rock about eighteen inches wide which if it continues will make the St. Julian a noted mine, and in truth justify the excited state of mind of its owners.

VOLCANO.—*Cor. of Dispatch*, Dec. 29: The Downs mill started this morning; they have struck very rich rock lately, and put more men to work. Gillick & Phillips are going to start up their mill this week. The rock from their mine is very rich, and continues to improve as they sink. All the mines at Pioneer are in operation. The Tunnel Co. will soon commence to wash.

NOTES.—*Ledger*, Dec. 29: The upper tunnel at the Mammoth claim is still 150 ft. from the shaft. An error in the calculations of the surveyor led to the impression that the work was 150 ft. nearer the desired spot than it actually was. It will require two months' work yet to reach the shaft. The Tailisman mill was expected to be started up in South Spring Hill rock yesterday. Jack Tregloan is in Amador, inspecting the mine, etc. More than 100 tons of rock have been hauled to the mill, and its paying character is conceded by all. It is not a pocket mine, but one apparently destined for a long career of gold production. At the St. Julian the owners took out about 800 ounces of rich metal early in the week, since which little has been done. At last accounts the ore body had widened to 3 ft.

MIDDLE BAR TUNNEL.—Thursday night, at the big tunnel at Middle Bar, something got loose about the machinery of the air compressor, resulting in one of the large fly-wheels being smashed to pieces. The wheel cannot be replaced inside of two weeks. This accident has brought one of the drills to a standstill. The other is in operation. The face of the tunnel is in a distance of over 400 ft.

Calaveras.

SAN ANDREAS.—*Citizen*, Jan. 5: Work has been resumed on the San Andreas Grave mine, and new pumping machinery will be placed in the mine to overcome the immense volume of water. It is said that a quartz vein was found in the level at a depth of 100 ft. from the surface, and though the rock has not been tested, it has the appearance of being good milling ore.

NOTES.—In addition to the Ora Plata mill, now in operation, Jim Morse's five stamp mill is running on ore from the screen of the hydraulic works of the Ora Plata Co. The ore is low grade, but free milling, and if the result in wet crushing proves as good as anticipated, a number of stamps more will be added. Col. Dorsey has mining interests across the river immediately opposite Collierville. It is said that he has bonded all the mines in that district for the sum of \$370,000. Jas. L. Sperry is working his iron mine in this immediate neighborhood. This mine at no distant day will become famous. The assays show 60 and 70 per cent iron.

ANGEL'S CAMP.—*Mountain Echo*, Dec. 26: Leper & Co. are still working the Invincible and it is paying well. The 40 stamp mill on the Reserve is kept steadily at work and is said to be paying well. The new mill on the Morgan mine will soon be completed and ready for operation. The ore body in the Porter mine is six ft wide and immensely rich. This will eventually be the leading silver mine on this coast.

El Dorado.

INDEPENDENCE MINE.—*Placerville Democrat*, Jan. 5: Some 16 or 17 years ago this mine was worked by Chas. McLane and Geo. W. Swan, who ran several tunnels and sunk a shaft to the depth of 50 feet. Much good milling ore was taken out, and a 12-stamp mill erected. About this time there was a misunderstanding between the owners, and work was suspended. Since then the mine has been idle, notwithstanding the ore taken out averaged about 16 per cent. Recently this mine was bonded to a company of Cleveland capitalists, who have put a force of men to work, and one of the old tunnels has been cleaned out for about 400 ft, and looks even better than was represented. Work is now being prosecuted on the shaft, which has already been cleaned to a depth of 20 ft.

GOOD NEWS FROM GRIZZLY.—There is no abatement in the "Grizzly Flat boom." All of the mines started up during the past year, with but one exception, are still working full forces of men, and, judging from the fact that these men get their money regularly after the monthly clean-up, gold in paying quantities is being found. The best news from this district is that a wealthy Eastern company has bonded the old Eagle mine, and will at once put a large force of men to work prospecting it. The Eagle is on the same lode with the old Mt. Pleasant and Eagle King, on String canyon, and in early days was very rich.

EUREKA.—*Georgetown Gazette*, Jan. 4: The Eureka mine is being pumped out, and next week active work will begin in the mine. The hoisting works and machinery have been very much improved, and everything is in tip-top shape. The reduction works will be completed in another week. No pains have been spared in making this one of the best put-up mills to be found in the State.

Mariposa.

MARIPOSA IMPROVEMENT CO.—*Herald*, Jan. 4: The clean-up made on the 24th, at the Yosemite mill, from 14 days run of 20 stamps on Mt. Gaines ore, resulted in a return of 34 lbs. 9 ozs., and, in gold, valued at \$5,700; also, gold in the battery sands and sulphurates estimated at \$1,500 more, or a total of \$9,000 for 14 days run of 20 stamps, at a cost, as returned to the Directors, of \$3,200. Had the full number—30 stamps—been in repair and running on the same ore, the result would have been \$13,500 for the two weeks, or a total of \$27,000 for a month's run. The Gaines mine is showing up

finely and a quantity of rich rock is being obtained, one piece of a few pounds weight yielding \$6.50.

A portion of the property of the Mariposa Improvement Co. consists of three claims on the Merced river, near the mouth of Cotton creek. In the progress of the assessment work at present being done on the claim, a fine ledge, four ft wide, of good ore, assaying \$28 per ton in gold, has been developed. This claim is so situated that for many years large quantities of the ore can be obtained without hoisting a pound or pumping water, as a tunnel will be run along the ledge, and will at once give an available supply of ore for a large plant.

Mono.

LUNDY.—*Bodie Free Press*, Jan. 6: The strike in the Clifton mine is one of great importance. The 3 strata of ore encountered 10 ft above have come together, forming 4 ft in thickness of solid quartz from all the drillings, and from any portion of which free gold can be readily obtained. Win. F. McKenzie and Pat Regan this week put a force of miners to work on the Mormon mine, a relocation of the Little Emma. The richest ore ever found in Homer district was taken from this mine—\$2,000 to the ton, or \$4 per pound, an average of a quantity crushed—one specimen the size of a walnut containing \$60 in gold. Mike Noonan has resumed work on his Hyena tunnel, in the western wall of Lake canyon. The Hyena is believed to be the southerly continuation of the Gorilla lode. Twenty-five to thirty men are still employed in taking ore from the May Lundy, and a number of mules are engaged in packing to the mill, which is kept running day and night. Ab. Bagby has resumed work for the winter on his tunnel, following the Grizzly lode into Mount Scowden, a short distance above the May Lundy mill.

BODIE BOOMING.—*Free Press*, Jan. 4: Wednesday morning W. H. Lent arrived in town, and that evening the stock closed at \$1.50. Yesterday it opened at \$2 in the morning streets, was \$2.25 on the morning board, jumped to \$4, and then to \$5.50 on the evening board, and closed at \$5.50 asked after the board. Reports of all kinds were flying around last night as to the cause of the raise. That which seemed to be most generally credited was, that while prospecting in the old workings at the 300 level, a vein of rich ore had been encountered, which had been followed for some distance and had pinched out; that afterwards it had come in again very rich, and in a way to suggest something like the old Bruce and Burgess bonanzas. This is entirely unofficial and unauthenticated. At all events, the stock quotations show that there is something unusual in the wind. There is considerable of the stock held in Bodie—probably 10,000 shares.

JORDAN.—S. O. Johnson the indefatigable prospector who has been at work in Jordan district for the past three years is in town again. He reports that the vein in the Levenfelt tunnel looks better every day, and that San Francisco parties have made him a cash offer for it. About half a dozen relocations were made in the district on New Year's morning.

STANDARD CON.—*Bodie Free Press*, Jan. 1: There were extracted and shipped to the mill 1,151 tons of ore; 2,085 ounces of crude bullion were received, and \$17,245 were shipped to the company. Upraise No. 1 from south drift No. 2, 1000 level, is up 180 ft showing five ft of vein, which looks well. Upraise No. 2 from same drift has been raised 18 ft; total height 101 ft. The vein is four and a half ft wide and looks well.

BODIE TUNNEL.—The ore in the north drift is fully three ft wide, showing a strong and well defined formation going north. The average sampling of the ore last week in the levels and upraises were \$19.50 per ton, although the 300 level and the upraise gave an average of over \$22 per ton.

BODIE CON.—During the week ending the 29th, there were 122,130 tons of ore hauled to the mill, and the same amount was crushed. The average assay value of the pulp was \$31.21; that of the tailings was \$4.72 per ton. The bullion shipment amounted to \$7,590.32.

Nevada.

GREYHOUND MINE.—*Grass Valley Union*, Jan. 8: The Greyhound mine on Deer creek, in the vicinity of the Imperial mine is said to be showing up handsomely at which the owners are feeling very much encouraged. The stock is all owned in Grass Valley, principally by working miners in the Idaho and Empire mines.

IDAHO.—A regular monthly dividend was declared by the Idaho Mining Co. yesterday of \$5 per share, amounting to \$15,500. The mine is producing well, and is in good shape, and the probability is that the present year will average well with the output of previous years.

DERBEE.—*Transcript*, Jan. 8: The first dividend of the Derbee Mining Co. will be paid at their office in San Francisco on Monday. It was contemplated to place the mine on a dividend paying basis last November, but owing to the improvements being made, and the laying in of the winter supplies, the commencement of dividends was postponed until now. The new tunnel being completed and all connections made, the expenses will be materially reduced. The mine is looking very fine, and the gravel that is being washed is of a most excellent quality. The stockholders have now a good prospect of getting their money back, besides having a substantial value to their stock in the future. The company have an immense body of ground that has never been worked, and there is no good reason why the Derbee should not be a regular dividend payer.

NEW YORK HILL.—*Tri-Weekly Herald*, Jan. 5: We learn that a rich streak of ore was struck in the 1300 level of the New York Hill mine, near Grass Valley, yesterday afternoon. The ledge is well defined and the rock taken out is of high grade, considerable free gold being seen in the quartz.

Placer.

BELMONT MILL BURNED.—*Argus*, Jan. 3: The mill and works of the Belmont mine, 3 or 3½ miles below Ophir, were burned to the ground on Tuesday night. The fire was undoubtedly the work of an incendiary, for the mine had been shut down for several months past. It was a 10 stamp mill, one of the largest and best constructed in the State. Mortar blocks had also been laid for the erection of another 10 stamp mill. It was well equipped, and must have cost from \$30,000 to \$40,000. Two watchmen were constantly employed to look after

the property—a Chinaman and a young white man named Charles Thompson.

ALTA.—A dispatch from Alta to the Sacramento *Bee* of the 31st ult. says: "The Alta mining shaft at this place is doing nicely, and it is expected that bedrock will be reached in a few days, when drifting will begin and give employment to a number of miners. Three shifts are working, and the shaft is down 180 ft. The gravel prospects well. A teaspoonful of gold was the result of one pan. Otis Atkinson and a few other Virginia City gentlemen are interested in the claim. There are not any shares for sale.

SUPERIOR IRON FROM PLACER COUNTY.—The *Oakland Tribune* says: The California Iron and Steel Co. find that the iron from the Clipper Gap mine, in Placer county, is of so superior quality that malleable castings can be made from it. As a test, castings have been taken from the annealing furnace bent entirely out of shape without showing a break, then heated and drawn out and the two ends welded. Castings in the shape of rings have been hammered into straight pieces, the material showing more of the qualities of wrought iron than of a casting.

Plumas.

CONKING LEDGE.—*Quincy National*, Dec. 29: During the past two years, Mr. D. L. Haun has been engaged in running a tunnel at Argentine to tap a quartz ledge, known among the old miners there as the Conking ledge. The rock proved very hard, and it has taken a long siege to get in, but a short time ago the ledge was reached, and proved very encouraging, as the rock prospects splendidly, and much of it shows free gold. But little development has yet been made, the tunnel only having been driven into it two ft, but Mr. Haun is sanguine that he has opened a valuable mine.

OPHIR CON.—*Greenville Bulletin*, Jan. 2: Fine prospects have just been found in the Ophir Con. Several years ago Mr. Sherman found some very rich rock on the mountain side, just above the old Crown Point. He prospected the place but little and after having failed to induce parties to help in running a tunnel to prospect the ground, he gave it up. Last summer as Mr. J. P. Hall was coming down the mountain, at a short distance from his Primrose ledge, he came across the place Mr. Sherman had abandoned. While carefully examining the ground he picked up several pieces of rock that showed gold freely. Mr. Hall at once started a tunnel, a contract being let which was lately completed. A cross-cut was started, and at a distance of 23 ft the ledge was struck. The first piece of rock taken from the ledge showed several colors of gold. The rock is of a snuff color, and by all is said to be the finest seen in the town for many a day.

NOTES.—A little to the south and east of the Ophir Con, the McIntyre Bros. and D. McIntosh are running a tunnel to strike the rich chimney worked many years ago by H. C. Bidwell. Work will soon be resumed on the Wild Cat, which adjoins the Ophir Con, on the west. Green mountain stock is rising in price at the New York Mining Exchange. It is worth 50 per cent more than it sold for less than six months ago. Barney Tutt has been running an astrak in Genesee valley for some weeks past. A clean up was made some days ago, and the rock was found to average \$15 per ton.

San Bernardino.

BIG BULLION SHIPMENT.—*Index*, Jan. 5: Today Hues Thomas and John C. King arrived from Oro Grande with 18 immense bars of bullion, amounting to \$31,570—the result of only 14 days' run on ore from the Silver King of Calico. This immense deposit of silver bullion can be seen at the Express office. It is the largest shipment of bullion ever made from Southern California, and coming as it does from 14 days run shows the extraordinary richness of the mines of San Bernardino county. Mr. Thomas says there is enough ore at Oro Grande to run the mill about 40 days longer, when all ore will be milled at the Oriental, Calico. Mr. Thomas showed us a specimen of ore from the 600 level that exceeds anything ever taken from the mine.

CALICO NOTES.—*Print*, Jan. 5: The Garfield has a large quantity of ore on the dump waiting shipment besides the regular amount mined and shipped every day. The Garfield and Gobbler are working large forces of men, and the numerous buildings near the mines indicate a new town independent of Calico. Ore taken from two new locations lately made in Snow Bird canyon assays 440 ounces. These claims, the Richmond and Lookout, are owned by Messrs. Taggart, Keys, Sinclair and McGlinchy. The Cuba No. 1 has just started up again. We were shown some very fine ore. The Cuba has large bodies of ore and will make a shipment to Colorado in a few days of about five tons. The Sam Houston No. 3 has been lately purchased by Messrs. Kauffman and Hart, and a large force of men are taking out ore for shipment. The Blackfoot mine is also working, and has a large body of ore ready for shipment. Mr. Geo. L. Bailey has re-leased the Kearsage mine and will ship 20 tons of ore to Colorado in a few days. Mr. Bailey informs us the Kearsage is the "boss" mine, and he is making big money for himself and the owners. The Bismarck owners are having a new road built which will greatly facilitate the transportation of their ore.

hasta.

FRENCH GULCH.—*Cor. of Redding Independent*, Jan. 4: The Niagara Mine Co. got their mill (cannon ball), 12 tons in 24 hours capacity on their claim, with the arrival of the "beautiful snow," which will soon be in running rig, storm or not. And these mills seem destined to revolutionize quartz mining.

OLD DIGGINGS.—The *Democrat*, says: Dan O'Neal's cannon ball mine is running on his old claim in the Old Diggings district near Buckeye. The rock in this claim is very rich and Dan expects to accumulate wealth fast. The Mammoth mine, an extension, is showing up some of the richest quartz ever found in the county. Leaf gold was found in this ledge last week.

Sierra.

GOLD BLUFF.—*Downville Messenger*, Jan. 5: The lower tunnel now being run on the Gold Bluff quartz ledge is in over a hundred ft, and is being run as rapidly as two shifts can push it. This tunnel will go in 1,200 ft before it reaches the ledge, and will strike it at a depth of 250 ft below the upper levels.

DEIDESHEIMER.—The survey of the recently located quartz ledges of Deidesheimer, Sunderhaus, Busch and Hughes, near Sierra City, has been com-

pleted by C. W. Hendel, inclusive of a mill-site and water right. A tunnel will be soon started for the pay chimney, and in the spring a 10 stamp mill put up, and a road made to the mine.

SIERRA CITY.—*Cor. Downville Messenger*, Dec. 29: There are over a hundred men employed at the Colombo, and 10 stamps started before Christmas. Everything in the shape of buildings, machinery, etc., needed in the working of an extensive quartz mine, has been provided, and naught remains but to crush the ore and ship the bullion to the mint. The Marguerite is paying steadily, and has a large number of men in their employ. The new mill of the Sierra Buttes Co., at the lower end of the city, is rapidly approaching completion. Sierra City bids fair ere long to become a second Virginia.

RUBY.—*Tribune*, Jan. 3: Fifty-two and three-quarters ounces of gold were cleaned up at the Ruby mine last Sunday, as the result of washing 350 car-loads of gravel, taken principally from the main tunnel. A 15 ounce nugget was included in the clean up. The main tunnel has already been driven 260 ft across the lead without encountering any signs of the east rim rock. Two new breasts will be opened out next week, making five in all. A few new hands have been put at work, but the scarcity of water prevents any large increase of the working force at present. There are two ft of snow at the works.

Siskiyou.

ORO FINO ITEMS.—*Cor. Yreka Union*, Dec. 27: Maurice Lewis, Burk & Co. are opening up the quartz lead known as the Bratt lead, with a force of five men. The lead is situated on the west side of the Oro Fino mountain, and due west of Oro Fino. The ledge is from 12 to 15 inches thick, and prospects remarkably well. Mr. Gilmore & Son of Hall gulch are down on their lead 150 ft, and the lower tunnel is in 250 ft. The ledge is about 10 inches thick, and prospects very well. Mr. Gilmore is an expert miner. The Lindsey boys and others have struck some very rich quartz somewhere on the Oro Fino mountain, but I have not learned exactly where.

Tuolumne.

WILLETTA.—*Sonora Independent*, Jan. 5: Bill Long has a 20 stamp mill ready to put up on his Willetta mine, which is about half a mile east of Jacksonville on the mother vein. One hundred tons crushed some time ago went \$11 per ton. The average width of the vein is from 50 to 75 ft of decomposed quartz, and averages from \$5 to \$8 per ton. The vein is from 200 to 300 ft high and can be quarried like a gravel bank. The material can be mined and milled for less than \$1.50 per ton, and can be milled for less than 50 cents per ton. The main Tuolumne river flows at the base of the mine, which is capable of furnishing an unlimited supply for any number of stamps desired for the year round.

NEVADA.

Washoe District.

ALTA.—*Enterprise*, Jan. 5: The whole line of pumps has now been enlarged and all are working smoothly. Men have been put to work at repairing the west drift. The east drift on the 2150 is found to be in good order, but in the west drift there are places where there are small caves and where it will be necessary to put in a few timbers.

GOULD AND CURRY.—The usual progress is being made in sinking the joint Best and Belcher winze below the 2500 level. The ground at the bottom is still soft, and some water is coming in.

SIERRA NEVADA.—Good headway is being made in the upraise from the 2900 level. The northeast drift on the 3100 level is still following the quartz streaks lying in that direction.

CROWN POINT.—Some ore is being taken out, but they are not yet able to put on a full force of men, as the mills on the Carson river can reduce but a limited amount of ore.

YELLOW JACKET.—A considerable amount of ore is being extracted, but owing to the low stage of water in the Carson river a full force of miners cannot yet be put to work.

UNION CON.—Good headway is being made in the main south drift on the 3100 level. The ground is still in vein porphyry of the usual character.

BEST AND BELCHER.—Good headway is being made in sinking the joint Gould and Curry winze below the 2500 level. The material encountered is of favorable appearance.

UTAH.—Good progress is making in the new northeast drift on the 1750 level. The ground works well.

IMPERIAL.—The main west drift is now within a short distance of the old upper levels, which it is intended to explore and overhaul for ore.

SCORPION.—The usual progress is being made in main west drift on the 500 level. There is no change of formation worthy of note.

COMBINATION SHAFT.—The new hydraulic pump at the 2600 level has been started up, and is found to work well and smoothly.

CALIFORNIA.—Fair progress is making in the joint Con. Virginia winze now being sunk below the 2700 level.

HALE AND NORCROSS.—The water has been pumped out of the winze below the 2700 level, and work at that point resumed.

OPHIR.—Some ore is still being extracted on the 150 level, and a winze is being sunk to the levels below.

CON. VIRGINIA.—The usual progress is being made in sinking the joint California below the 2700 level.

MEXICAN.—Are timbering up the main north drift on the 3100 level and putting in drain boxes.

UNION SHAFT.—The work of easing timbers and repairing is still continued at the 2300 station.

ANDES.—Some low grade ore is being extracted, and prospecting continues at several points.

OVERMAN.—A small amount of ore is being taken out of the old upper levels.

BELCHER.—Some ore is still being extracted from the old upper levels.

Belmont District.

BELMONT MINE.—*Courier*, Dec. 20: The Belmont M. Company's mill will soon shut down, and will remain closed during the winter. It is the intention of the company to enlarge the leaching works,

as the present run has demonstrated that there are not enough leaching tanks to keep the mill running constantly. Enough is known of the leaching process, however, to justify the assertion that it is a success here.

SUPT. N. C. Bissett informs us that work will be prosecuted with energy in the Belmont mine this winter.

OFFICIAL.—The following is a copy of Supt's letter of December 29: The ledge in north stope from 200 level is considerably out of place, but showing large bodies of quartz and some ore. All other stopes from this level as well as stopes in South Tunnel looking well and yielding the usual amount of ore.

NOTES.—Very rich chloride ore has been struck in Green Aldrich's mine, the Seventy-seven. The mine owned by Messrs. Bartell, Hall and Colligan continues to look well. The Tybo mill will close down on Monday next.

Candelaria District.

COLUMBUS CON.—*True Fissure*, Jan. 5: The main shaft has attained a depth of 25 ft below the station on the third level. The ground is now more compact than heretofore and showing streaks of mineral matter, the most of which is quartz of a promising character. The work of sinking the shaft will be continued until it has reached a sufficient depth for cutting out stations for the fourth and fifth levels. The drift from the shaft on the third level has reached a length of about 20 ft. The slow progress is owing to the ground in the drift being very hard.

MOUNT DIABLO.—There are no new developments to report from the mine for the past week. Work was stopped on the night of December 31st, and the mine closed down temporarily for the purpose of making repairs to the engine and putting in a new foundation for the same. The engine was sent to Carson City to the shops of the Virginia and Truckee railroad company on January 3d. It will be several weeks before everything is in shape to start work again, and meanwhile there are but a few men working on the foundation and on the surface of several of the claims. The ore on hand at Belleville has been milled and the mill will be cleaned up as soon as possible. A shipment of bullion amounting to \$6,537.28 was made December 31st.

SODA SPRINGS.—An air of hopefulness is prevalent at Soda Springs. It is reported from authentic sources that it is exceedingly likely that arrangements will be made to immediately start the copper furnace at Soda Springs. This will be agreeable news for the owners of copper mines.

Eureka District.

FARROW MINE.—*Sentinel*, Dec. 30: George Story, with another miner, is doing some good development work on Farrow mine, situated on South Alhambra Hill. The main shaft was sunk on heavy iron croppings, and in this the assessment work was done for this year, when a small streak of ore assaying \$114 per ton, silver, was encountered. A tunnel was formerly started from a point below the cropping to cut the lode. It is now in 75 ft, and the prospect for a paying body of ore is very good.

PHOENIX.—The tributors in the Phoenix were rushing around yesterday to ship 20 tons of ore before Jan. 1st, in order to save \$5 per ton in the rates of reduction raised after that date.

NOTES.—Good reports continue to come in from the Enterprise mine at Diamond. The company is making money right along. Tributors in the Bald Eagle are working in strictly virgin ground, with good prospects of finding themselves "in bonanza." Parties are talking about leasing the Matamoros furnace to reduce custom ores. There is also some talk of putting up a sampling mill. Considerable quartz and iron is coming in, in the workings of the Golden Rule Tunnel. The prospects there were never so good as now. A new drift will be run from the shaft in the Silver Connor mine to tap the ore body below the present stope. The mine is panning out well. Assessment work is being completed on the Pioneer, the Red Bird Company's mines, the Eagle Series and other mines in that locality of Goodwin canyon. Messrs. Hilkey and Yerrick are developing the Nahant mine, on the eastern base of Silverado Mountain, by means of a new tunnel, now in 20 ft. There is good pay ore on the surface, about 100 ft above the tunnel, which it is their aim to prospect. A connection has been made between the second level of the Eureka Tunnel and the incline winze from the first level. The facility for prospecting the mine between the two points is good. The force of men employed is small, but the mine is paying its way. Advance capital is what is needed to do the dead work.

Paradise District.

RELOCATING CLAIMS.—*Silver State*, Jan. 4: According to reports from various parts of the county, a revival of the mining industry is setting in. In almost every district more or less claims were relocated on New Year's morning, and in Paradise and Willow creek everything that was subject to relocation was taken up, as the general belief is that there will be some excitement in these districts next spring. At Unionville, which has been under a cloud since the Arizona mine was shut down, the relocators were busy, as miners have not lost faith in the camp. Several claims were also relocated on Winnemucca mountains, and in Gold Run district, east of Golconda, very many were taken up.

Ptoche District.

DON'T WANT TO SELL.—*Record*, Dec. 29: The owners of the Raymond & Ely property, who stated that they were anxious to sell it, were offered the price they said they would take, when they at once raised in their price some \$20,000. The Meadow Valley Co. were offered the price they said they would be glad to sell for, when they raised the price of their property also. The owners of these properties, the way it looks to the public, have no idea of selling them.

EL DORADO CANYON.—The mill at El Dorado canyon, leased by Cronin, was to have started up on last Monday. Mining matters at the canyon are prosperously moving along. The mill of the Southwestern Company continues turning out the silver bars at a lively rate.

ASSESSMENT WORK.—The claim-owners in this whole vicinity are now putting in big ticks doing assessment work. They do not want to take chances on relocating. There are too many people on the alert and watching chances to take up claims.

Reveille District.

MANHATTAN.—Alf Doten writes from Austin to

the Virginia *Enterprise*, of Jan. 6: The old Manhattan mill has just started on a fresh run, after a couple of weeks' rest for repairs and a thorough clean-up. A gratifying peculiarity with this institution is that its bullion yield is continuous, the regular shipment of bricks being made every other day, or oftener, whether the mill runs or not. In fact some of the heaviest shipments have been made since the mill shut down. A thorough clean-up of this mill literally means something. Crushing the ore by Stedefeldt dry process involves the gradual accumulation of light, rich chloride dust everywhere, as well as in the regular dust chambers and other traps. The whole concern has to be scraped and swept from one end to the other, and the pans are thus kept working long after the batteries have ceased their noisy racket. Just what bricks have been turned out in the way of bullion shipments during these two weeks that the mill has shut down, would make any newspaper man feel rich.

Tuscarora District.

BELL ISLE.—*Time-Review*, Jan. 3: The north drift on 450 level has been advanced 10 ft during the week, showing no change worthy of mention.

NORTH BELL ISLE.—Work is progressing in and about the mine as usual, and the usual amount of ore being extracted.

ARGENTA.—South crosscut in 38 ft, progress for the week 8 ft. Ground is more favorable, and have cut a small stringer of low grade ore.

ARIZONA.

TONTO BASIN.—*Prescott Courier*, Dec. 31: The section of Yavapai county known as Tonto Basin, is east of the Verde river and north of Salt river. Samuel Hill recently induced Charles Ryall to visit his mine, the Zula. Mr. R. found the mine opened by shaft, to a depth of 75 ft, at the bottom of which he saw a nine ft vein of quartz, carrying, per ton, in gold, \$75. Two hundred tons of such are on the dump. The ore is free milling. Mr. Hill tells us that he will keep men sinking on the lode and that, as the ore body is constantly enlarging with depth, he has reasons for believing that it will yet be 15 or 20 ft wide.

ROSS CAMP.—*Prescott Courier*, of Dec. 28: R. W. C. Merrington is preparing to work concentrators in connection with stamps at the Senator mill. He has ten stamps and plenty of mill room, but at present only intends running five stamps, with two Frue concentrators. Mr. Merrington has on hand lots of ore from several different mines near by, from 10 to 25 tons each. There are fifty mining claims within five or six miles of the mill, carrying gold and silver in connection with base metals and ranging, in assay value, from \$25 to \$75 per ton, which can be concentrated from five to ten tons into one, when the product will bear shipment to reduction works at Argo or Pueblo.

SUNSET MINE.—Rich horn silver has been struck in the Sunset mine in the Weaver mountains. The mine is owned by Secretary Van Arman, and the developments now being made on it are demonstrating the fact that the genial Secretary has "caught on" to a bonanza.

HOWELLS.—The five stamp mill at Howells is all the time going. It and the Cornish rolls have reduced as high as 22 tons of ore in 24 hours. Two concentrators are not sufficient to take care of the pulverized stuff and a third one will soon be put up.

SILVER BELT MINE.—*Cor.* of *Prescott Courier*, Dec. 31: Everything is much better than we anticipated. We are taking out plenty of ore, have two carloads ready for teams. The south stopes are on a bonanza, have black sulphurets in the south level, will start two shafts on it to-morrow.

THE RUCKER MINE SOLD.—*Epitaph*, Dec. 22: Among the papers filed for record yesterday, were deeds from G. E. Hinnet, T. D. Byrne and John Dunn, conveying to Ben Williams, of the Copper Queen, the Rucker mine of Bisbee. The Rucker was the first location made in Warren district. The claim is in reality an eastern extension of the Copper Queen, but a few ft intervening between the two claims. Forty-one thousand dollars is said to have been paid for the claim, of which Messrs. Dunn and Byrne, who owned five-sixths, received \$20,000 each, and Hunter \$1,000 for the remaining sixth.

HARMONICA.—*Mohave Miner*, Dec. 30: Jack Stoen, Mike Farrell and Tom Burke are putting in their best licks on the Harmonica mine in Gold Basin district. The development consists of an 80 ft shaft and a drift 40 ft long. Work is carried on in the main shaft and the ore continues to improve as depth is attained. The ledge has been crosscut some 17 or 18 ft but its full width has not yet been determined. Ore from the mine will carry from \$20 to \$80 per ton in free gold.

YUMA COUNTY.—*Arizona Sentinel*, Dec. 22: An important discovery of gold placers has been made in this county. Don Marcelino, an old resident of Yuma, is the discoverer. The diggings are back of the Castle Dome Range, 50 miles from Castle Dome Ldg, and 80 miles southeast of Ehrenberg. The placers are ten miles from water and are being worked with dry washers. The pay dirt is from four to five ft thick, and the most gold is found in the gulches. The discovery was not generally known here until a few days since, as most of the trading was done in Ehrenberg. The heavy rainfall of late has compelled a cessation of work, for the time being. So far some three thousand dollars has been taken out and that in a very short time. This discovery is of great importance to Yuma county, and along with the steam dry washers now being worked at the old La Paz diggings will add greatly to the product of gold from this section.

OLD PAT.—*Pinal Drill*, Dec. 29: The Old Pat mine is situated three miles north of us in the high hills sloping towards Happy Camp. It is, to be sure, still a prospect, but one that shows several tons of very rich ore on the dump. As the work progresses they are following the mineral.

QUIJOTOA MINES.—*Virginia Enterprise*, Jan. 2: The Tucson *Star* of December 21st says: From William A. Scott, who has just returned from the Quijotoa mining camp, our reporter has obtained some points of interest. At the town of Logan, which is at the base of the Quijotoa mountains and near the Flood-Mackay bonanzas, there are now about 100 people, but the place is filling up so rapidly that each day makes a vast difference in the population. The permanence of Logan depends more or less upon the result of boring for water. I think,

however that Logan will be the permanent town, and that all the water needed for mills and other purposes will be found in the well now being bored. That will settle the townsfolk question. "The mines are the biggest I ever saw. I tell you, you have no idea, if you have never been there, of their extent and richness. I had no idea, until I went there, of the value of these Quijotoa mines. They are simply immense." Mr. Scott says the road between this city and the great camp is alive with people going to the bonanzas—some in wagons, some on horseback, others in stages, and some even walking and carrying their blankets on their backs. He also met long trains of wagons loaded with lumber and goods of all descriptions.

CONTINGENT.—*Sahar Belt*, Dec. 29: The sale of the Peerless group of mines, in the Quijotoa district, recently bought for by Messrs. Mackay and Flood, is contingent on their finding water within 1,500 ft, of which there is not a reasonable doubt. Water, wherever sunk for in that section of country, has been invariably found at a depth of not exceeding 125 ft.

STAY AT HOME.—*Epitaph*, Dec. 30: Mr. Archie Nevins, a well known mining man, dropped into the city yesterday from the Quijotoas, and from him was gathered a few items concerning the new bonanza. About 20 men will be the number employed when the mines first start up. There are now in camp fully three times as many practical miners as will be needed for some time, and Mr. Nevins advises parties looking for work to wait at least four months. Water has to be hauled about six miles at present, although the bonanza firm are busily engaged in sinking a well at Logan City and intend going to a depth of a 1,000 ft if necessary before abandoning the attempt to find water.

IDAHO.

ELKHORN.—*Ketchum Keystone*, Dec. 26: Col. I. Lewis states that the Wood River country is booming. The town of Ketchum, near which the Elkhorn is situated, is now a lively little city of 1,000 inhabitants. A branch of the Oregon Short Line is at Hailey, within 12 miles of Ketchum, and will reach it in the spring. There are 4 water jacket smelters at Ketchum, running upon custom work, and erected at an expense of \$250,000. What is known as the Wood River region is a belt of country 80 miles in length, commencing at the Sawtooth mountains and extending southward on each side of Wood river 20 miles. In this region not less than 5,000 mines, principally silver, have been located in the past three years, and of these at least 150 are now yielding princely revenues.

PARKER VEIN.—*Ketchum Keystone*, Dec. 29: On Christmas eve the men driving the tunnel to tap the Parker vein at the depth of 100 ft, struck ore, and not till they had driven 5 ft further was the opposite wall of the ledge struck. In driving across the vein four tons of high grade ore was extracted, consisting of auriferous copper, carbonates and galena. Three tons of ore worked as a sample, yielded 587½ ounces in silver per ton, and assays running as high as 2,865 ounces have been made. The mine is on Elkhorn Hill, about one-fourth of a mile above the famous Elkhorn, and is owned by Geo. Montgomery, Eugene Gillenwater, E. H. Terry, W. H. Watt and Sam Allen.

PRIDE OF IDAHO.—Dave Teachnor & Co. have completed the dead work on the Pride of Idaho, on East Fork, nine miles from Ketchum, and are now ready to go to sinking. A small batch of ore from this mine was sold to the Philadelphia Co. last summer for a little over \$200 per ton. They will, in a few days, commence extracting ore for shipment in the spring.

BANNER.—*World*, Dec. 25: Jess Bradford, who has a contract from the Elmira Co. for running 200 ft east on the Wolverine mine, Banner district, has lengthened the drift to 108 ft, besides crosscutting 38 ft. The ledge is 37 ft between walls. A vein, four inches thick has been struck on the hanging wall. The highest assay was \$136. This drift commences at the face of the main tunnel, 800 ft in length, and at the depth of 300 ft. Austin and Gallagher, who have a contract for running 200 ft west on the Crown Point from the same place, drifted 24 ft, then made a crosscut north, 45½ ft to the hanging wall. The first 2½ ft were through ledge formation with iron oxidized; then through decomposed quartz 23 ft, where the ore forms. The ore seams are from 4 inches to 14 inches thick of high grade ore. From all appearances they are on the extreme east end of the ore chimney. Everything looks favorable for a bonanza.

KETCHUM.—*Statesman*, Dec. 25: Mr. Joseph Pinkham arrived here last evening from Ketchum. He reports things in the most flourishing condition. The Philadelphia smelter is in full blast. The output of the Elkhorn for ten months of the present season was 400,050 ounces of silver, valued at about \$1.12 per ounce, making a total value of about \$450,000. This mine could have been bought a year ago for \$30,000. Now it would be difficult to guess at what figures it could be held.

COEUR D'ALENE.—*Elko Free Press*, Dec. 28: The Eureka *Leader* says: Mr. J. G. Parker, who is at Eagle City, Coeur d'Alene, has written a letter here to his wife, from which we are permitted to make the following extracts: "This place has exceeded my expectations. There is a better show for a great camp here than at any other place I have ever seen. It cannot fail. If only one out of ten of the many claims located turns out good there will be from 1,000 to 3,000 miners at work here in a year. Besides the 40 miles of placer ground already located, there have been some very rich quartz strikes made. This is surely going to be a great camp, for even now there are 100 men cutting logs and moving them to their lots, where buildings are being erected. There are three times as many houses here as when I arrived, and notwithstanding the dangers and difficulties incident to a trip, every day brings several new faces. Several have let contracts for the building of houses, and then hastened away for fear of being kept in here for the winter, on account of the trails being covered with snow. I have got in here in good shape; have a central location and the only hewn log house in town and the second one with a board floor. This by the way, is a luxury, as lumber rapidly sells for \$150 a thousand feet."

MR. J. C. BAKER.—*Inter-Mountain*, Dec. 29: It is the opinion of Mr. J. C. Baker, who recently returned from the Coeur d'Alenes, that if gold be dis-

covered on bed rock in Pritchard's gulch, the greatest mining stampede ever known will be the result next spring. The drain of Roubidoux & Co. has attained a vertical depth of 9 ft and bed rock is likely soon to be reached. About 300 men are in the diggings and many more are going in and coming out daily. There are no provisions there for sale and the stamperders can stay there only while the grub which they take in lasts. There is a small restaurant there which can only feed a few people.

ANOTHER.—*Virginia Enterprise*, Jan. 1: J. E. Stevens, formerly foreman of the Chollar mine, writes as follows from the new northern placers: I have been in camp five days. We have now four ft of snow, and the weather is extremely cold. Mining operations are suspended for the winter. I think this is going to be a good camp. The placers are very extensive, and there are some good quartz claims. Of course there can be no further prospecting done until the snow goes off, when this will undoubtedly become one of the liveliest camps in the country. It is believed that 20,000 people will come here in the spring. About 250 men will winter here. Provisions and all kinds of supplies are scarce and costly. It is difficult to get in here now, but will be much more so in the spring when the rush begins.

MONTANA.

CABLE MOUNTAIN.—*Butte Miner*, Dec. 29: The Cable mine is probably the richest gold producing mine in America. The property is closely held and the actual output cannot be definitely stated, but it is estimated that not less than \$10,000,000 has been taken out during the past four years. The mine at a depth of 140 ft shows a ledge 80 ft wide, which has been uncovered to the 400 level and from which pieces of quartz are taken carrying so large a percentage of free gold as to make them practically nuggets of metal. Last summer two tons of white quartz from this ledge yielded \$80,000 in gold, and it is not uncommon for a single blast to knock down from \$1,000 to \$2,000 worth of these nuggets. The mine is provided with a 20 stamp mill and employs 80 men in the mine and mill.

PYRENEES.—This also is a gold property, operated successfully by Salton Cameron, who formerly owned the Cable mine. The Pyrenees, 240 rods west from the Cable line, is developed by four tunnels which tap the ledge at a horizontal depth of 20, 50, 100 and 350 ft respectively, and a drift which has been driven on the ledge 800 ft east and west. The ledge is a true fissure vein from 6 to 12 ft wide, with well-defined foot and hanging walls, and carries a streak of decomposed, iron-stained quartz varying from 1½ to 10 ft in width. It is understood that a 20 stamp mill will be erected on the property next spring.

MARIA.—One of the most promising prospects in the district is the Maria, immediately north of the Alice and southeast from the Wabash mine. The property is owned by the Le Mout brothers. The lessees have erected a steam hoist and are prosecuting the work of exploration. The shaft has attained a depth of 120 ft. At the 70 level a west drift was run, from the stopes of which 91½ tons of ore has been milled which yielded a return of 105 ounces of silver to the ton. Three veins of considerable value have been developed by open cuts, and a station is now being cut at the 120, from which crosscutting will be commenced immediately to tap the ledge developed above in the 70 level.

MOUTON MINE.—Reports of strikes in the Mouton and Bell mines created a flutter of excitement early in the week. In the case of the Mouton, the mine is looking well, and the developments in the 400 foot southwest drift are satisfactory, but the managers regard the ore body uncovered as merely in the course of ordinary development, it having been not yet sufficiently explored. A winze has been started on the ledge from the 400 level, with a view to forming a connection with a drift to be run from the 500, but the winze is now in water, and sinking has been temporarily suspended.

BELL.—In the Bell mine, the discovery of a valuable ore body in the northwest drift is exceedingly satisfactory. The ledge is believed to be a continuation of that in the 240 level of the old workings. The ledge is from 6 to 8 ft wide, and carries a 2 ft streak of ore assaying 50 per cent of copper and 60 ounces silver. The extent of the ledge has not yet been determined, but the indications are that it is sufficiently extensive to supply the smelter with ore for a long time to come.

NOTES.—At the Montana Copper Co's Colusa the work of exploration is actively progressing in the 400, where a large body of low grade has been developed. The Alice properties are looking well and the usual amount of ore is being extracted. An extensive body of high grade ore has been uncovered in the 300 east of the Magna Charta. The Lexington product for 1883 will be nearly a million and a quarter of dollars. Clark's Colusa continues to look well. The north drift from the 210 foot station is now in a fine body of ore. The Pollack tunnel is still in good ore and the Clark brothers are making a good thing out of their lease. Clark's Fraction is worked on the 300 level through the Alice shaft and 5 or 6 tons of high grade ore is raised daily. The Amazon mine, at the mouth of Horse canyon, is likely to be worked by California parties, who it is understood are negotiating for its purchase.

NEW MEXICO.

STEEPLE ROCK.—*Cor.* of *Silver City Enterprise*, Dec. 28: The Nugget is running smoothly, taking out an abundance of good ore all the time. The Great Eastern, which is the east extension of the Nugget, and owned by Kistler and Currie, is looking well and bids fair to rival the Nugget mine. Assessment work is all that is being done at present. Work has been temporarily suspended on the Little Emily, having a four ft vein of rich ore at the bottom of the shaft. The owners of the Turk have finished assessment work and will resume after the first of January. The Eagle has had 125 ft of sinking done upon it in the last month by contract. The Jersey Lily, owned by Livingstone & Stowell, will have 100 ft of work done upon it after the first of January. The Ophir, owned by Barton, McDonald and Guthrie, is showing up big every day. The Carlisle mine is now running under the new management and many of the old timers are still retained by Mr. James.

For Mining Shareholders' Directory, Stock Reports, etc., see page 29.

Platinum.

American Occurrences.

Platinum, either comparatively pure, but more commonly alloyed to a considerable extent with iridium, osmium, or other metals of the same group, is found in small quantities in many of the gold placer regions of the Far West and Pacific coast, notably in California; and also occurs associated with placer gold in Virginia, North Carolina, Georgia, and other Southern States. A nugget of platinum found near Plattsburgh, New York, weighing 104.4 grains, is described in the *American Journal of Science*, III., xxi., p. 123, 1881.

Platinum usually appears in the form of small rounded and flattened grains. The occurrence of platinum in the United States thus far has been a matter of scientific interest rather than of any economic importance. Small quantities have from time to time been saved from the sluices of hydraulic mines, but were merely kept as a matter of curiosity. In 1877, 1878, and 1879, an irregular search was made for it in view of the then existing and prospective demand for the metal for incandescent electric lighting, and samples were obtained from many points, but many of the localities reported in the Southern States, as well as elsewhere, failed to afford specimens when specifically tested. No platinum in place, that is as ore in a lode, has at yet been discovered; its occurrence being confined, as above stated, to the placer deposits. A vein of platinum is reported to have been recently discovered near Hailey, in the Wood River country, Idaho, and small shipments of the ore have been made to the smelting works at Omaha. Although this find is called a vein, in the absence of definite particulars it is reasonable to assume that the metal is found in the usual form of stream platinum.

It is quite probable that in the future the production of platinum in the United States may become a regular industry; though from the indications which have been observed it does not appear likely that it will ever reach any very considerable importance. The quantity of American platinum marketed in 1882 was about 200 troy ounces. There are no regular quotations for the domestic metal. One manufacturer reports that the crude, unrefined American platinum which he has handled ran as low as .520 in fineness, as against .850 for the average crude Russian.

The method of mining is analogous to that of placer gold, with the exception that the apparatus for saving platinum depends upon gravity alone, and not upon gravity and amalgamation. The plant required for manufacturing platinum is simple and inexpensive, and the art has been developed to a high extent in this country. The best crucibles, etc., are made by hammering plate of the greatest possible density into shape. It is said that the cheaper spinning process which is sometimes employed has the effect of opening the texture of the metal and rendering utensils so made short-lived and unsatisfactory.

Imports.

The supplies of platinum consumed in the United States are derived from the Ural mines, where it is found in placers. The Russian platinum, however, mostly comes through French, English, and German laboratories, where the native grains are worked into merchantable metal. During the fiscal year ending June 30, 1882, unmanufactured platinum (wire or rod and sheet or plate) to the value of \$304,290, and manufactured platinum (consisting of three or four large stills for rectification of sulphuric acid) worth \$32,260 were imported, and during the same period manufactured platinum articles (consisting mainly of used-up stills sent to Europe for repair, or of scrap-metal) were imported to the value of \$19,244. Very little native Russian grain platinum is imported. The price of Russian unmanufactured platinum in New York at the close of 1885 was \$6 per troy ounce. The terms "manufactured" and "unmanufactured" are used in accordance with an old ruling of the Treasury Department drawing the line between dutiable and free entries. "Vases, retorts, and other apparatus, vessels, and parts thereof, for chemical uses," are now on the free list.—*Williams' Mineral Resources*.

The Signal Service.

The officers in charge of the various signal service stations on this coast have done all in their power to render the service of value to the people of this coast. They have shown much interest and industry in making known the results of their observations, and have shown a praiseworthy disposition to discover the peculiar conditions prevailing here, and to give the best deductions they can from their studies for the information of the public. But except in a general way they have not been able to do very much in forecasting weather because they have not sufficient data or means for obtaining it. They know, and the people generally know, that the arrangements on this coast are wholly inadequate to local needs, and that if the government is to make this branch of its service of general value to the shipping and producing interests of this coast there must be some provision made for equipping a local bureau and a sufficient number of outlying sta-

tions. This has been repeatedly urged upon the attention of Congress by our horticultural societies and mercantile organizations, and has been duly explained by our Representatives at Washington, but no steps have been taken yet. The measures should not be longer delayed. The coast is advancing rapidly in every way, and is continually paying larger contributions to the national treasury. There is every reason why due acknowledgement of these facts should be made by the general government. The subject is fitly set forth by a paragraph in the report just submitted by the Chief Signal Officer in his annual report to the Secretary of War, and which has been transmitted to Congress. He says:

I again call attention to the necessity of a separate office, under the charge of an instructed officer, on the Pacific coast. If a weather service for the country is to be maintained, this important region should not be neglected as it has been. The climatic conditions there differ from those that obtain in the other parts of the country. There are now only 11 stations on the Pacific Coast, and there should be many more, all in charge of an officer with headquarters at San Francisco. In order to carry out its own purposes and the wishes of the people of the coast, the Signal Service must have more officers, more men, and more money than has been given it for the current year.

This is a plain statement of the facts, and it would indeed seem proper that they be no longer disregarded. Not only is this not done, but as funds were short during the past year the Pacific coast was left without any weather service at all during one-sixth of the year. The Signal officer says:

During two months of the year the Pacific coast stations were entirely cut off, for the reduction of \$65,000 in the appropriation for "the observation and report of storms" for the last fiscal year made it necessary to ask the Western Union Telegraph Company to greatly reduce the service which it had contracted to perform, although the terms obtained by this office were based on the agreement that the company should do a certain amount of work. The statute provides that warnings of the approach of storms shall be given by telegraph, and yet the service was left without the means of paying for the necessary telegraphing. The result was not only the reduction in the number of stations to which attention had been already called, but the exclusion of the office from all reports from the Pacific coast for May and June, 1883. This office can do only the work that Congress is willing to pay for. If the necessary data can not be obtained, weather indications will not be so trustworthy as they have been in the past. The number of stations must be increased rather than diminished, if a proper advance is to be made in the art of applying the laws of meteorology for the welfare of commerce and agriculture.

It does indeed seem that this important branch of the government service is being shabbily treated, and it is doubtless true that the people's representatives do not understand the needs of the people in this matter. Probably most of the Congressmen come in no closer contact with storms than can be ward off with a silk umbrella, and they are naturally forgetful of the dangers of the mariners and the losses of the agriculturist, because his products are wholly at the mercy of unheralded storms. Possibly a good storm on the sea or a loss of a crop on land, would give these gentlemen new ideas on this subject.

Notwithstanding the meager and arms-length nature of the service on this coast, it is shown that a creditable amount of good work has been done. The following is the percentage of verifications for the Pacific coast regions for the months given:

DISTRICTS.	1882.					1883.				
	July	August	September	October	November	December	January	February	March	April
North Pacific.	83.3	88.9	94.7	91.7	89.1	85.9	97.0	65.0	93.9	92.7
Middle Pacific.	90.3	98.2	93.8	91.1	85.0	85.7	93.2	92.3	95.6	81.7
South Pacific.	90.3	99.1	98.9	100.0	93.9	96.1	93.2	93.7	94.6	86.5
Total	88.0	95.1	97.4	94.3	86.0	88.2	85.7	89.0	93.8	87.0

The indications for the Pacific coast are for the "weather" only, and for the period the general percentage is 90.5.

We have a host of experienced meteorological observers on this coast who would be pleased to give the results of their experience for the public good. They would constitute a corps of advisers of incalculable value to the Signal Service if their assistance were requested and provided for. The aid of such men, whose observations extend over a period of twenty-five to thirty years, would of course be of greater benefit in making known the meteorology of this new region than similar counselors can be at the East; and yet the Service has such advisory bodies in the older parts of the country. The report to which we have alluded says:

In fifty-four cities meteorological committees have been appointed. These committees confer with the observers of this service and make such suggestions as occur to them for the improvement and development of weather work to the end that it may be of the utmost value to the commerce of the country. These committees are looked upon as important auxiliaries of the weather service, and not only are the observers on stations under orders to confer with them, but it is a standing order that inspecting officers,

on their rounds of duty, also consult them.

Just such provision should be made here. All the wise and experienced observers should be enlisted. The service should be extended. There must be a local office for digesting observations and drawing forecasts. Will Congress provide for this work this winter?

RAIN TABLE FOR SACRAMENTO—PREPARED BY THE LATE DR. T. M. LOGAN AND DR. F. W. HATCH. Arranged according to the seasons, showing the amount in inches of each month, during thirty-four years, and for each rainy season, to Dec. 31, 1883; also the quantity for every month, and the annual amount of rain.

MONTHS.	1840	1850	1860	1870	1880	1881	1882	1883	1884
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May
1840	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1850	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1860	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1870	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1880	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1881	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1882	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1883	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1884	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	33.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SPEAKING of the recent "find" in the St. Julien mine, Amador county, which is only three miles from Mokelumne Hill, Calaveras county, the *Calaveras Chronicle* says that several well developed ledges have been discovered and located on the Calaveras side of the Mokelumne river of late, all of which seem to be an extension of the justly celebrated Mammoth mine. San Francisco capital has already taken hold of some of the properties recently discovered.

NOTWITHSTANDING the season, prospectors are working their way into the Cœur d'Alene diggings.

The Nevada Nickel Mines.

As the discovery of nickel on this coast has opened a new field of mining industry, and one which has every indication of becoming equal to the Comstock in richness, the *Record-Union* concluded to gather the facts. In this discovery, as in hundreds of other great finds, these mines have been lying for years within plain sight of the stage road where people constantly travel, without even notice. Samples of the ore have been sent to different assayers for copper, but none ever took the trouble to analyze the rock until it was sent to this city. In 1881 samples of this ore were sent to Charles Bell for copper assay.

Upon examination it was found to contain a large per cent of nickel. More of the ore being secured, it was analyzed, proving the first result. Upon his showing William S. Bell was sent to discover the locations and succeeded in finding the richest and most valuable nickel property ever discovered. The discovery being kept as secret as possible, little was known as to its extent until recently. The property is located in the northern portion of Churchill county, Nevada.

The property has been well prospected and the largest bodies of this mineral exposed that has been known. The nickel ores of Pennsylvania average but two per cent. They are reduced on the ground to fifteen per cent, and sent to Camden, N. J., where they are again reduced and the metal extracted. The nickel found in Oregon has also been opened, but to what extent cannot be ascertained. Thirty tons of the Nevada nickel was sent to London, which graded twenty-nine and one-fourth per cent. These mines are the only ones yet discovered that carry uniformly the three distinct characters, viz: Arsenuret, which is a grayish metallic red; and arseniate, a beautiful apple green; and arsenite, having a dark metallic luster. As developments progress the former characters are merged into the latter, caused by non-oxidation. Several samples showed to reporters have assayed, both by Edwin Booth, of San Francisco, and Charles Bell, of this city, sixty-five and one-half and sixty-six and one-fourth per cent, being the richest ever discovered in the world.

Testing Safety Lamps.

The many accidents which occur in coal mines make the question of relative safety of the various types of lamps one of great interest to miners. A trial of safety lamps and extinguishers at a colliery in Great Britain the other day developed some interesting points. A number of lamps, including the Stephenson, the Davy, Mueseler, Clanny, and the Protector, were examined and found to be in good condition preparatory to undergoing the usual tests in various currents of air. The various lamps were placed in the air-ways, the air passing along at certain velocities, the Davy firing at a comparatively low rate (about 6 ft. per second), proving that it fires at a much less velocity than the other lamps. A Stephenson, in the first instance, stood a velocity of 17 ft. per second before it exploded. This being much higher than the lamp had been known to stand before, it was again tested, and went off at a velocity of 11 ft. per second. What is known as the Smithurst lamp, being a Mueseler with a tin shield, was also tried. The Protector, an adaptation of the Mueseler, stood well for several seconds, then trembled and went out. The experiments, however, were not considered quite satisfactory, and it was agreed that further trials should be postponed until the testing apparatus itself should be proved and made accurate. An adjournment was then made to the surface for the purpose of trying some extinguishers and hose adapted for extinguishing fires in mines. For this purpose three fires were made, so that each apparatus should work independent of the other. Four Dick's extinguishers worked very well, and gave satisfactory results, showing that chemicals can be advantageously used, whilst the apparatus can be taken in any direction and the water thrown where most required. In connection with these extinguishers, it may be said that a number of them can be carried by the men and made to act simultaneously. Foster's chemical engine was set to work and put out the fire. The nozzles of the extinguishers appeared to be only about one-eighth in. in diameter, so that the quantity of fluid poured on the flames was not large. It was very apparent, however, with an ordinary hosepipe with a nozzle 3 in. in diameter, sending a copious supply of water from such an orifice, it extinguished the fire in less time than either of the other two descriptions of machines.

PROGRESS OF ARIZONA.—The *Star's* annual trade review of Arizona shows the population of the Territory to be 85,000, having doubled in three years. The assessed wealth is \$24,200,000 against \$12,000,000 in 1880. The stock increase for the year was 50 per cent. The silver and gold output for the year was \$8,000,000; copper bullion output, 28,000,000 pounds. Peace with the Indians is at last secured, the last of the renegades from Sonora having surrendered to the San Carlos Agency last week. General security is felt, and renewed confidence in Gen. Crook's control of the Indians. There is a general revival of prosperity over the Territory. There are now 98 public schools in the Territory, with a total of 8,500 pupils.

Sudden Outburst of Gas in Mines.

On the occasion of the two most serious explosions in our mines during the present year we are made more familiar with some of the causes which lead to these lamentable catastrophes. Sudden outbursts and blowers, it is said, are the primary causes of most explosions. One of these is believed to have led to the explosion at Moorfield colliery last week, and from the evidence given on Tuesday last at Barnsley with respect to the fatality at the Wharfedale Colliery, it would appear that the gas ignited from a sudden outburst, probably from the roof. At Moorfield a heavy blower was met with in one of the headings, which could not be approached even with the best of safety lamps. The gas came out in large quantities, and it is evident that some of the men who had Davy lamps in endeavoring to escape fired it. This is very easily to be accounted for. In some mines there are large quantities of gas in cavities, and these are at times cut into and the gas escapes as blowers, both from the coal and from the fissures in the strata. It usually escapes in greatest abundance near faults or other irregularities of the beds. It is said that these blowers of gas are never found above the sea level, and when blowers do take place the greatest caution is necessary on the part of the men to ensure their safety. But at the Moorfield colliery some of the men had Davy lamps, and these may have led to the serious loss of life which took place. The Davy lamp usually remains safe unless moved or carried in a current of air; but then when the velocity of the latter is comparatively moderate the flame is liable to pass through the gauze and set fire to the mixture outside of it. It would appear that at Moorfield the Davy lamp was so exposed, at least such is the theory advanced.

At the inquest, which was terminated on Tuesday, at Barnsley, with respect to the seventeen men whose bodies were recovered from the Wharfedale Colliery, the cause was attributed to a sudden outburst of gas, for which the district has been noted. At the Wharfedale Colliery the men were working with "protector" lamps, burning colza-lime; but there was also a Davy lamp in the vicinity of the place where the explosion took place, though it had not been used. Be this as it may, there was a vast accumulation of gas—an extensive outburst, in all probability, from a crosscut on the main air-way course; but whence it came there was no evidence to show, the probability being that gas was liberated in large quantity, and that the outburst affected the velocity of the air, thus bringing out the flame of a lamp to the explosive mixture. The result of the evidence given was certainly by no means satisfactory, even to the jury, who returned a verdict that the seventeen persons brought out of the colliery after the occurrence were killed by an explosion of gas, but how it was caused there was not sufficient evidence to show. In conclusion, it may be said that, as blowers and outbursts take place suddenly, and from places least expected, it is impossible at all times to guard against them. All that can be done is to work fiery mines with lamps that will be self-extinguishing in an explosive atmosphere.—*London Mining Journal*.

Very Young Quartz.

It is a generally accepted theory that quartz, sandstone, slate, etc., are geological formations which require thousands of years to form. A few days ago, in Virginia City, Conductor Havenor showed the editor of the *Appeal* a specimen of quartz which never could have existed over fifteen years ago. The quartz in question was taken out of the Yellow Jacket mine from between the timbers. The timbers were put in fifteen years ago, and the material forming the quartz had apparently oozed through a crack and adhered to the timber. It was about the size and had the appearance of a cauliflower. There was a mass rather soft and crumbling to the touch, and in places woven together like threads, and in this mass, and a part of it, were three distinct and perfectly formed quartz crystals. The mass had been pushed through the crack while in a plastic state, and then formed in the bunch described. The specimen in the possession of Mr. Havenor shows where it adhered to the timber.

He also has a piece of sandstone taken from the creek at Stevens' mill, near Dayton. The mill was built twelve years ago, and a portion of a wooden stake driven into the ground at the time is solidly imbedded in the sandstone, which is as firm and hard as any sandstone of the old sandstone period. There is a rusty nail in the wedge.

About twenty years ago a spring was dug on American Flat. Week before last it was found that a hard stratification of slate had formed on the bottom. It was broken up with an axe, and Mr. Havenor secured some good specimens. The slate was half an inch thick, perfectly hard and brittle, and had adapted itself to the conformation of the spring, where it had formed like scales on a teakettle.

Will some geologist explain how the theory will hold water that all these classes of rock are the result of thousands of years of chemical action.—*Carson Appeal*.

The Plymouth Consolidated Company, of Amador county, has 100 stamps in operation, and is paying its monthly dividend regularly.

USEFUL INFORMATION.

Photographing on Linen and Silk.

A Detroit photographer says: "There is this feature about photographing on linen: You can wash and boil the work and it won't come out. There is some special interest shown among society people just now on this subject, because of some napkins used at the banquet given to Henry Irving, the actor, before he left London. His photograph was on each one, and, of course, it was intended as a souvenir for the guest to take away with him. The silk or cambric is printed from the negative. There will be a rage for it if it once gets started, and people will have photographs printed on their curtains, and tidies, and in handkerchief corners. The face of a beautiful young lady on the corner of a gentleman's handkerchief, would be much more attractive than a monogram or initial letter. It would be just the thing for hat linings and bands." The *Detroit Free Press* suggests that not the least of the advantages of such photographing would be that the wash would be promptly returned if the missing pieces were to haunt the wretched landress with a vision of her customers.

TO KEEP GILT GOODS BRIGHT.—Stationers always have more or less loss in gilt goods and it is no easy matter to keep these gilt goods bright and clean. The following is a good recipe: Gilt articles, if of metal, may be cleansed by rubbing them gently with a sponge or soft brush moistened with a solution of half an ounce of potash, or an ounce of soda, or perhaps best, an ounce of borax, in a pint of water; then rinsing them in clear water and drying with a soft linen rag. Then luster may be improved in certain cases by gently heating them, and then applying gentle friction with a soft rag. A very diluted solution of cyanide of potassium will answer the same purpose by applying in the same manner as above, washing in water and finally drying by gentle friction with a linen rag; but as this substance is very poisonous, it is not to be recommended for household uses. Gilt frames of mirrors, pictures, etc., should never be touched with anything but clean water, gently applied with a soft sponge or brush.

CHANGING THE TRACK OF TORNADES.—A correspondent of the *Scientific American* proposes the following method for changing the track of tornadoes: Take one keg or barrel of common rifle or cannon powder to the limit of your city or town where it is approached by a tornado. Fix it to an artillery priming tube, having a string to it about 100 yards long. Take your position at the end of the string, holding it taut. Wait till the tornado seems to be precisely over the powder, then fire the powder by pulling the string, and if the charge is large enough, that gyrating, whirling tornado will be effectually blasted out of existence; at least, made harmless till blown beyond your town, where, perhaps, it will reform itself. If the tornado could be advertised a few hours before its appearance, giving time for preparation, the suggestion might possibly be valuable.

NEW USE FOR ASBESTOS.—Powdered asbestos is made by M. Erichsen, of Copenhagen, for making a special enamel or coating. It is mixed with soluble salts, such as silicate of potash and mineral or other colors, which combine with the silicic acid so as to form a product which withstands the action of oxygen, heat and atmospheric changes. This substance furnishes a refractory glazing, which protects porous materials, and which can be applied to wood, to gas or water pipes, to brick walls and to constructions of stone or cement. When it is employed on masonry or on wooden articles, the surface is first washed with soap and water. In the manufacture of this enamel or paint, it is only the refuse of the asbestos which is employed, and this refuse, it is said, would be worthless for any other purpose.

HOW FIRE MAY BE CARRIED IN COTTON.—Edward Atkinson, of Boston, says: "Fire lurks in a cotton bale for weeks. The cotton which was injured somewhat over a year ago in Biddeford, Me., was moved to South Boston for sale. The fire broke out again more than once while it was at South Boston being made ready for sale. It was then sold at auction. The fire broke out again in one parcel while it was on the cars being carried away, and in another parcel after it had been received at a factory where it was to be used. The latest outbreak was, I think, thirty days after the original fire."

ABOUT WAGON WHEELS.—The *Farmer's Review* says: I have a wagon on which, six years ago, the felloes shrunk so that the tires became loose. I gave it a good coat of hot oil, and every year since it has had a coat of oil or paint, sometimes both. The tires are tight yet, and they have not been set for eight or nine years. Many farmers think that as soon as wagon felloes begin to shrink they must go at once to a blacksmith shop and get the tire set. Instead of doing that, which is often a damage to the wheels, causing them to dish, if they will get some linseed oil and heat it boiling hot and give the felloes all the oil they can take, it will fill them up to their usual size and tight-

ness, keep them from shrinking, and also keep out the water. If you do not wish to go to the trouble of mixing paint you can heat the oil and tie a rag to the stick and swab them over as long as they will take oil. A brush is more convenient to use, but a swab will answer if you do not wish to buy a brush. It is quite a saving of time and money to look after the wood work of farm machinery. Alternate wetting and drying injures and causes the best wood soon to decay and lose its strength unless kept well painted. It pays to keep a little oil on hand to oil fork handles, rakes, neck-yokes, wheel-trees, and any of the small tools on the farm that are more or less exposed.

A FIRST CLASS violin has seventy separate parts. Two form the back, two the belly, six the blocks, six the sides, twelve the lining, twenty-four the purfling, and there is the tail-pin, its pegs and fastening, the tail-piece, the bass-bar and sound-post, the bridge, nut, head and scroll, the finger-board, and the four pegs and four strings. The body weighs about half a pound, with the neck and scroll about twenty ounces, and when tuned to pitch the pressure on the bridge is over ninety pounds.

THE NEW HOOP MACHINE.—It is claimed that the newly invented Boston hoop machine will make from 20,000 to 30,000 half round hoops a day, cutting two, three or four from a pole, as occasion requires. One of the results of the introduction of this new machine will be the utilization of ironwood saplings for hoops. This tough and almost indestructible wood, which resists the tools of the cooper, is said to be handled without difficulty by the Boston hoop-making machine.

SINCE the adoption of standard time about 400 applications for patents have been filed for clock dials and other devices intended to present the twenty-four hours in a convenient manner and without unduly crowding the figures. A large number of these applications have been rejected by the Patent Office upon evidence found in an old volume that Prince Soltykoff once possessed a watch, made in 1547, on the dial of which the hours from 1 to 24 are arranged in two concentric circles.

A CAMEL has a foot furnished with a pad, which resists the burning sand of the desert for years, which would wear out a horse's hoofs in a few weeks.

A SINGLE leather belt, one inch wide, traveling 800 feet per minute, will transmit one horse-power, provided the pulleys are both the same.

GOOD HEALTH.

Philosophy of Eating.

Were men to exercise the same judgment in regard to their own food that they do in feeding domestic animals, there would be less illness on account of errors of diet. For a matter of such universal importance it has been the subject of many absurd theories.

The world seems to be divided between those who "eat to live" and those who "live to eat." The proper line may be drawn somewhere between these extremes. There is little to choose between a glutton and one who eats too little from a sentimental notion that it is vulgar to eat; and that the less one can eat, and still manage to live, the more refined and spiritual one becomes. If a man has no control over his appetite, and no judgment as to the quantity of food he requires, it would have been better had he belonged to a lower order of animals, subject to the control of a higher intelligence. Neglect or refusal to partake of sufficient food to sustain the body in its full vigor should be regarded as evidence of disease, requiring the attention of a competent physician. Nature will not patiently submit to be abused or cheated.

The quantity and quality of food required in each individual case depends on the size and health of the person, and on his occupation. A person of sedentary habits should regulate the diet to the requirements of the system, remembering that it is safer to err on the side of eating hardly enough than too much. Over-eating produces accumulation of fat, which is a disease of itself, and increases the quantity of blood, rendering one liable to heart disease and apoplexy; and paradoxical as it may seem, insufficient food tends to produce the same diseases. Either condition causes derangements in the circulation that may induce some troubles.

If we follow the indications of nature we are safe as to foods. What the appetite craves is usually best for us; the stomach notifies us when we require food, and when we have eaten enough. It is often the last mouthful that invites an attack of dyspepsia.

"Variety is the spice of life." In nothing is this more applicable than as to foods. Select a list of foods that experience has taught us are most acceptable, and then from the list get a variety for each day of the week. Salt meats should be used sparingly, because they are more indigestible than fresh. Pies and rice puddings try the digestive organs severely, and cannot be safely indulged in by adults, except they have vigorous out door exercise. The quantity and quality of food should depend upon what is required of the individual; just as the amount of

fuel requisite depends on the work a steam engine has to perform.

A wise regulation of the food supply can be made to supersede the use of medicines to a very great extent.—*Journal of Health*.

INTERIOR PROPERTIES OF VANILLA BEANS.—A distinguished Professor of the Faculty of Medicine of Bordeaux, Dr. Layet, has, says the *Lancet*, just read an interesting communication on certain injurious properties of vanilla, of which a satisfactory explanation has up to the present been wanting. The affections have been studied at a warehouse in Bordeaux, where on an average 25,000 to 30,000 kilograms of vanilla arrive every year. In these storerooms the pods are cleaned, sorted, and classed according to their quality. These manipulations seem to cause certain symptoms among the workmen and women. At first an itching of the face and hands associated with a powerful smarting sensation is experienced, and the skin becomes covered by a pruriginous eruption, swells, reddens, and desquamates at the end of some days. At other times there is a feeling of malaise with dullness, stiffness, and muscular pains, which oblige the worker to give up this kind of labor. The cutaneous malady seems to be due to an acarus which appears as a small, white, rounded body occupying generally the ends of the pod. This insect does not penetrate the skin like the *Acarus scabiei*, but determines the affection by its mere contact. Probably the parasite is aided in its irritant effects by the presence of "givre" in the form of pale acicular crystals. The nervous symptoms M. Layet is inclined to put down to the manipulation of inferior pods of vanilla containing much oily juice enveloping the seeds in the interior of the silique.

WHEN TO TAKE MEDICINE.—The chief causes of disease are errors in diet, errors in dress, intemperance, impure water, unwholesome food, defective teeth, and blood poisoning from inhalation of impure air and noxious gases. Disease induced by any one of these causes, almost invariably manifests itself by disorder in the functions of the liver; there the alarm is sounded first, and if not attended to promptly the trouble is liable to extend to other vital organs. Dyspepsia, constipation, chronic diarrhoea, disease of the kidneys, dropsy, rheumatism, catarrh, consumption and various forms of skin diseases often proceed directly from derangement of the liver. Attention to the liver forestalls other diseases. The remote cause of a majority of our ordinary ailments, is taking cold; the natural functions of the body are retarded, and waste material is retained in the system long enough to do mischief. The usual remedy is to take a cathartic or a laxative in order to remove it. But a more convenient and a more natural plan, in ordinary cases, is to cut off the food supply for twenty-four hours, and trust to nature to do the rest. Instead of food, a few teaspoonful of hot water drunk during the day will hasten the desired result. Whenever the bowels become constipated there is an uncomfortable feeling in the system, often accompanied by restlessness and anxiety of mind. The above suggestions, if followed strictly, will bring relief more promptly than medicine and without its inconveniences.

THE INCREASE OF INSANITY.—The increase of insanity is not confined to this country. In 1868 the number of lunatics reported in France was 34,000; to-day it is nearly 60,000. It should be remembered, however, that such statistics presumably become more accurate and complete every year, and moreover, that many a person is now pronounced insane who would have been considered merely eccentric fifteen years ago. There are 103 lunatic asylums in France, of which 61 are public and 42 private.

TO TEST THE PURITY OF WATER.—If you think the water you use regularly for drinking is impure, try the following test: put one and a half pints of water into a clean glass bottle; add to it a teaspoonful of pure white sugar, cork it and shake until the sugar is well dissolved and then set in a warm place for 48 hours. If it is unfit for drinking it will be turbid and milky at that time.

WE BEAT THE WORLD ON DOCTORS.—The proportion of doctors to the population in different countries is given as follows by the *Siglo Medico*: France, 2.91 per 10,000; Germany, 3.21 per 10,000; Austria, 3.41 per 10,000; England, 6 per 10,000; Hungary, 6.10 per 10,000; Italy, 6.10 per 10,000; Switzerland, 7.06 per 10,000; United States, 16.24 per 10,000.

A LINIMENT FOR RHEUMATISM.—The *Therapeutic Review* says: Methyl salicylate (oil of wintergreen) mixed with an equal quantity of olive oil or linimentum saponis, applied externally to inflamed joints affected by acute rheumatism, affords instant relief, and, having a pleasant odor, its use is very agreeable.

LUPINOSIS.—C. Arnold has extracted from lupus a shining brown solid matter of pleasant aromatic odor and taste. In water it dissolves slowly, forming a turbid solution. In doses of ten grammes it produces the usual symptoms of lupinosis, especially acute jaundice.

BRAIN WEIGHT.—The average weight of the brain of a man is three and one-half pounds; of a woman, two pounds and eleven ounces. The brain of a man exceeds twice that of any other animal.

MINING SCIENTIFIC PRESS

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SAN FRANCISCO:

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Passing Events.

The decision in the famous debris suit, which was rendered this week, is the most important thing to the miners of the State of California which has occurred for a long time. We give a full abstract of the decision, and speak of the subject in another column.

The tables of bullion product printed elsewhere show a yield of over ninety millions of dollars from the mines last year. There is not much change in California figures, though what there is notes a falling off. The mines in San Bernardino county and that region will help out the year, though the cessation of hydraulic mining consequent on the injunction will greatly decrease our bullion product.

We intend next week publishing a double edition of the PRESS, the space in which will be mainly devoted to a review of last year's mining work.

In the Tabernacle at Salt Lake, Apostles Cannon and Woodruff both declared that Mormonism, in all its features and doctrines, would be continued, whatever Congress or the country might threaten, and that the progress of the church could only be stayed by killing all the saints.

THE Queen contemplates shutting up Buckingham Palace still further. It is now used as an occasional town house by several of her children, and this she finds expensive.

The Debris Decision.

It seems strange that in California, known to the world's end as the "Land of Gold," any branch of mining should be declared a public nuisance. Yet this is in effect what has been judicially pronounced, by the decision just rendered, and an abstract of which is published in this number of the PRESS.

When, in 1849, the fabulously rich placers of the State of California astonished the world by their productiveness, a new and progressing industry was born to these United States. The first steps were then taken towards establishing mining on the basis on which it has since stood. The influence of those few yellow grains found in the tail race of Sutter's mill was far-reaching. From that little rill grew a broad and golden stream which spread in all directions to the very end of the earth, and which, while it carried prosperity and wealth to those beyond our borders, enriched as well the dwellers at the source. When the news of the discovery of gold in California flashed like wildfire through the settled and steady-growing regions on the Atlantic side of the continent, the electric spark kindled into life and being the spirit of adventure and change only among the bravest, most hardy, and enterprising of the land. These, a chosen band, selected by the Spirit of Progress to found a new empire by the Western sea, threw aside all habits, customs and traditions to build new homes and found new communities in a land before tramped only by the cloven hoofs of cattle or the moccasins of the aborigine. With toil and labor, through difficulties and danger by sea and land, they came the thousands of miles stretching between them and the Land of Promise. The weaker dropped by the way—the fevers of the isthmus, the Indians of the plains and the stormy terrors of Cape Horn claiming victims from every band. These men came for gold. They came too, with the purpose of taking up those occupations which cluster about a mining community. But mining was the paramount interest, and was the foundation on which this great State was built. The golden millions poured in steady and branching streams over the summits of the mountains and back to the homes in every nook and cranny of the nation. Men saw such opportunities for enrichment as they had never before dreamed. The influence of the golden grains gathered from the sand, gravel and earth of California's surface was magical. They brought thousands and thousands of men, women and children to these shores to stay; to build up villages, towns and cities; to establish a great commercial center, and make a country world-renowned for its productiveness and resources. From here they spread along the ocean and back from it, until other States and Territories were organized and formed. Nevada, Idaho, Montana, Utah, Oregon, Washington, Arizona and New Mexico might still have been in their original wilderness but for California gold. The settlement of the most progressive and prosperous section of the United States is the direct result of the mining industry. Mining has led; Agriculture has followed; and in some cases the latter has grown to overshadow the other. California was the pioneer in the great mining industry of the nation, as her people were the pioneers of the Pacific coast. For all these years the mines of this State have been steadily worked, and from the experience gained have grown new systems, new machines and new plans for adding to the world's wealth, which have been copied and followed wherever mining is pursued.

And now comes a Judge who says, in effect, that hydraulic mining, from which has come the bulk of California's gold for many years back, is a public nuisance. The older Californians who have grown up with the State will hardly believe that such a thing could come to pass. It is not worth while now to review the causes which have led to this decision. Every argument for and against hydraulic mining has been advanced; eminent lawyers have been employed; hundreds of witnesses have been examined; experts have given their testimony; interested parties have expressed their opinions; associations have done their work; the case has been tried; the decision rendered; and it is that hydraulic mining must stop.

But it will be proper to briefly consider what will be the effect of the decision upon the miners. They are law-abiding people, and what-

ever hardships they may consider they have undergone, they will submit to the dictates of the law and stop their work. Their mines will be closed down; their tools put away; their dams left open; and, in many places, their homes abandoned. In a great battle they have been defeated.

One gleam of light remains for them. The Judge declares that if it can be shown that the debris can be properly controlled and impounded, opportunity will be given to have the injunction dissolved. Moreover, there is this: Judge Temple decided that debris dams being built, and the heavier sediment caught, hydraulic mining could go on. Judge Sawyer decides hydraulic mining a nuisance. The case has been appealed and the Supreme Court of the United States will yet finally decide which of these two decisions is right.

But this may take years. The Supreme Court is, unfortunately, notoriously slow. The hydraulic miners in the section affected must now obey the injunction of the court and stop their work. Thousands of men will be thrown out of employment; and equally serious is the fact that many communities which have depended on this industry will be broken up. Of course the gold product of the State of California in 1884 will be greatly reduced by the stoppage of these mines. Some of them will be worked by the drifting process, in all probability, but the great majority of them cannot be so worked profitably.

The misfortune falls on a community generally remarkable for their intelligent, noble and generous disposition, and even among their bitterest enemies sympathy is felt for their condition. Years ago not the most far-seeing man could have foretold such a result as this, as no parallel case has occurred in the world's history.

Carbonate and Oxide Copper Ores.

About two-thirds of our copper comes from the Lake Superior region of the United States, and about one-half of the remaining 30,000,000 pounds comes from the carbonate and oxide ores of Arizona, New Mexico and California. More skill is required, of course, in getting a yield out of the sulphureted ore than in the simple melting and refining, which is all that is demanded in the production of copper from its metallic or oxidized condition.

The ordinary American practice in the treatment of carbonate and oxide ores has been almost entirely built up within the past ten years, and, owing largely to the perfection of the water-jacket furnace and the use of simple fan blowers, it is economical and satisfactory. The ore is so sorted at the mine—where necessary—as to yield at least ten per cent copper; and after having been worked to egg size by a jaw-crusher, is fused in the water jacket furnace with coke as fuel, with the addition of the necessary fluxes, limestone, iron ore or quartz.

Many of the deposits occur in a limestone country, and contain more or less oxide of iron, so their reduction is simple. Some of the deposits, however, which carried their entire copper contents in an oxidized condition, are now showing a considerable proportion of copper glance and other sulphur compounds; and the unwelcome sight of an increasing quantity of matte is beginning to complicate the hitherto almost unparalleled simplicity of the process. At some works it has been the habit to recharge this into the furnace, a highly unscientific and expensive practice, as it merely adds to the fuel used, and in nowise increases the metallic copper production, except in so far as it may become slightly oxidized, and a small part of its sulphur volatilized in its passage through the furnace. At other works it is sacked and shipped East, but this is expensive. The metallic product of these furnaces is shipped East to the refining works, in the shape of black copper, assaying usually from 94 to 98 per cent; and the competition for this class of material, and the favorable rates for pig copper as compared with ingot, bears little inducement for the establishment of refining works in the neighborhood of the mines.

The Four Hills mine, in Plumas county, which in a month or two yielded more than \$100,000, was crossed by a trail which has been traveled every summer since that county was inhabited by the white man, and at one time a shaft was sunk within a few inches of the rich deposit.

Condensing Fumes from Furnaces.

Mr. E. M. Alderman, of Tucson, Arizona, has just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a fume-condensing attachment for ore furnaces and smelters, a description of which will be of interest to furnace men. The invention consists in a novel means for introducing a fine spray of water among the vapors and fumes as they pass along to the exit. The fumes are allowed to pass from the stack of the furnace into a pipe suitably supported, and inclined slightly below the horizontal. At one end it has a discharge, and a continuation vertically, to serve as the exit for the smoke. Supported above this pipe is a water-distributing pipe, supplied with water under pressure. Let into the condensing pipe at suitable intervals are small pipes having an elbow shape, their horizontal arms, which occupy a position about the center of the circumference of the condensing pipe, being finely perforated. These pipes are connected by hose and coupling with the water pipe so as to be removed readily when repairing or cleaning may be necessary.

The water under pressure is forced out through the finely perforated pipes in minute streams, almost spray of themselves, and, coming in contact with much force with the sides of the condensing pipe, the water breaks into spray. Through the spray the fumes and vapor from the furnace have to pass. None can get by without becoming thoroughly saturated with moisture and condensed. The spray being applied only at intervals, clear space is left between each spray pipe, and the spray, which is carried forward by the current, has time to be thoroughly absorbed by the fumes before they pass through the next spray.

The condensing pipe being practically horizontal, there is no necessity for various retarding and obstructing devices as are used in certain kinds of smoke condensers, where the condenser is vertical and showers of water fall thereon. The condensing pipe in this is free for the draft to advance the fumes from one spray cloud to another, having clear space and time to effect complete absorption and condensation. The slight incline of the pipe carries off the condensations. It is the arrangement of the system of spraying that the patent covers. The use of water for condensing is not new, of course, but this precise plan of using it is covered.

Mining Improvements.

Mining has been placed on such a basis that anything that tends directly or indirectly to lessen cost of production is eagerly adopted, not as a passing fashion, but with the earnest purpose of keeping abreast of the times. In this country we are constantly at work devising means for improving the mechanical appliances of mining. Hoisting and pumping machinery, cages, cars, pans, mills and all such things are being continually simplified and improved.

In Europe the same tendency is apparent. Here the improvements are not only in the general design of machinery, but in its details or construction and erection. A noticeable feature in Belgium, for instance, is in the reduction of the dead weight in coal tubs and cages. This is everywhere being effected with all the speed that the capital at disposal admits of. The means by which the reduction is being brought about are, first, the improvement of the general design, and the details of the construction of these portions of a colliery plant; and second, the substitution of steel for iron. By the use of steel plates for coal tubs, remarkably light vehicles are produced. In one colliery where this change has been carried out by the gradual substitution of steel tubs for the old wooden ones, the ratio of the dead to the total weight has been reduced from 69 to 40 per cent. The old iron drawing cages are being rapidly replaced by improved steel constructions. These differ somewhat from existing types, and they certainly combine the maximum of strength and rigidity with the minimum of weight. Some recent accidents have again raised attention to the question of safety catches on cages. Much ingenuity has been fruitlessly expended upon these mechanical devices for preventing the fatal consequences of a broken rope, if we are to judge from the great number of contrivances proposed, and the fact that none have been commonly adopted.

NEEDLES has organized a "101" Committee of Safety, and the citizens mean business.

Yankee Fork and Bay Horse Districts, Idaho.

The map on this page shows an outline of both Yankee Fork and Bay Horse districts, in Custer Co., Idaho. In this county the chief mining districts are found on the Salmon river and its tributaries. Bay Horse district, in the eastern part of the county, contains some very important mines, the best developed of which is the Ramshorn. This is an immense ledge, on which are a number of producing mines, such as the Utah Boy, Post Boy, Mono, Juliet, Vermont, Broadway, Redemption, Silver Bell and Quincy. The Ramshorn was the first location. The vein is from two to six feet wide, in slate formation, and the ore contains chloride, gray copper and lead. The mine is worked below 800 feet in depth by means of tunnels. In the last report of the Director of the Mint is an account of the mines of the district, from which we make the following extracts:

Bay Horse District.

The Utah Boy is the first extension south of the Ramshorn, and is owned by the same company. The Post Boy is next to the Utah Boy, and is opened by tunnel. On the Juliet mine a tunnel has been driven 990 feet, and a shaft sunk 135 feet. The ores are quite similar to those found in the Ramshorn. The Broadway mine is located on Poverty Flat mountain;

smelters in operation, or ready for work in this district. The Bay Horse Mining and Smelting Co. have a 20-ton smelter on Bay Horse creek, under the management of Mr. A. J. Crook.

The Salmon River Mining and Smelting Company's smelter, situated on the banks of the Salmon river, at Clayton, has a capacity of about thirty tons. The mines of this section, taken as a whole, are of a promising character, and will doubtless make large out turns of bullion; but few sales of mining property have been made, and but little outside capital has been employed in their development, and yet they have been steadily opened and have made fair returns for the time and labor expended.

Yankee Fork District

Includes the mines located upon the Yankee Fork, Jordan creek, and the adjacent mountains, Estes Peak, Norton Hill and Custer Hill. The principal mining camps are Custer and Bonanza City; the first situated near the junction of Jordan creek and Yankee Fork, and the latter some six miles down the Yankee Fork, near its confluence with West Fork. The Custer mine is located about half a mile from Custer City, at an altitude of 8,200 feet above sea level. Here, by an inexplicable freak of nature, seldom witnessed, from that portion of the ledge heretofore worked, by erosion or other causes, the hanging wall has disappeared, leaving the ledge smooth and unbroken, and having the

wagon road. This mine was discovered as early as 1876, by W. A. Norton, who commenced work in a small and rude way. With two assistants he made an open cut, and the ore taken from it was crushed in hand mortars and yielded a very large sum. The upper tunnel was started in 1877, and the ore extracted was shipped to Salt Lake City. An adit was built in 1878, since which time, except a portion of 1881, it has been continuously run. The yield during 1882 was reported as having been \$80,000.

The Pilot group of mines adjoins the Dickens on the west, and are the property of an Eastern company. Estes mountain is about six miles from Bonanza City, near the source of Jordan creek. The principal mine is the Montann. The character of the ore is a sulphuret and chloride of silver and gold, about two-thirds of its value being gold. Since its discovery the mine has shipped to Omaha, Salt Lake, the Bay Horse smelter, and other markets, high grade ore to the value of a quarter million of dollars. The value of the ore shipped ranged from \$500 to \$1,200 per ton, during 1882.

The Snowbird, Pioneer, Charles Wain and Cynosure mines lie parallel with the Montana, and about 600 feet distant. These veins are bold and prominent and can readily be traced over the apex of the mountain for about 500 feet. This section requires more milling and

Mining Debris.

A Decision in the North Bloomfield Case.

Judge Sawyer this week rendered the long expected decision in the case of Woodruff vs. the North Bloomfield Gravel Mining Company. It makes the injunction perpetual, virtually prohibiting hydraulic mining. The decision is very voluminous, but we give a full abstract as follows:

This is a bill in equity to restrain several mining companies on the western slope of the Sierra Nevada mountains from discharging their debris into the Yuba river and its alluvials, by which it is carried into the Sacramento and Feather rivers, filling them up and injuring their navigation, and sometimes injuring neighboring lands by overflowing and covering them with debris.

Lieutenant Colonel Mendell's report to Congress in January, 1882, on the injurious results of hydraulic and other mining, will furnish many of the facts relied on, since it has been recognized by both sides, and the remedies it suggests being confirmed by other evidence. In 1855 the water which carries away the earth and debris of a gold-bearing bank was discharged through a rubber hose, with nozzles of not more than an inch in diameter; by later machines the nozzles' size and pressure were largely increased. Now, for instance, an eight-inch nozzle at the North Bloomfield mine discharges 185,000 cubic feet of water in an hour, with a velocity of 150 feet per second. At some of the hydraulic mines the "Monitor" machines are worked night and day.

The Yuba River Drains

About 1,330 square miles of Sierra, Nevada and Yuba counties. Its basin's highest elevation above tide water is 8,000 feet; its lowest, 200 feet. The debris complained of is mostly discharged into its tributaries. Colonel Mendell says that 700,000,000 cubic yards may be assumed to represent the amount of gravel remaining to be worked by hydraulic process tributary to the Yuba. The beds of all the streams mentioned, from the very dumps of the higher mines to the junction of the main Yuba with Feather river, have been filled up at some places to a depth of 150 feet, and all have regularly graded themselves, so that a railroad track might be laid upon their beds for the whole distance. Their channels are choked and clogged with debris. Most of it will from year to year be carried further down, and ultimately to the valley. The ordinary annual floods are unable to carry all of it off, and it accumulates in vast amounts. Any extraordinary flood that may occur will sweep it into the valleys. The Yuba's load of sand and gravel has risen until it now stands above the level of the adjoining country on either side. This eruption from the mountains has destroyed over 15,000 acres of alluvial land. Before hydraulic operations commenced, rich, black bottom lands extended on each side of the Yuba, and on them were some of the finest farms, orchards and vineyards in the State. These have been ruined by debris and abandoned. Levees were built along the ridge on either side of the Feather river, but they broke and Yuba county was flooded. The filling of debris between the levees is several feet above the level of the surrounding country on the outside. The filling gradually rises as the river is ascended till, at Squaw Flat, by the entrance of the foothills, it is 150 feet deep. This change in the depth of the water has impaired the practicality of navigation. Greater exposure to overflow now exists for all riparian lands on both these rivers. For years the comparatively deep draft steamers, Senator and New World, ran regularly through Steamboat slough. It is not navigable now for light draft river boats of to day, and its navigation has been abandoned.

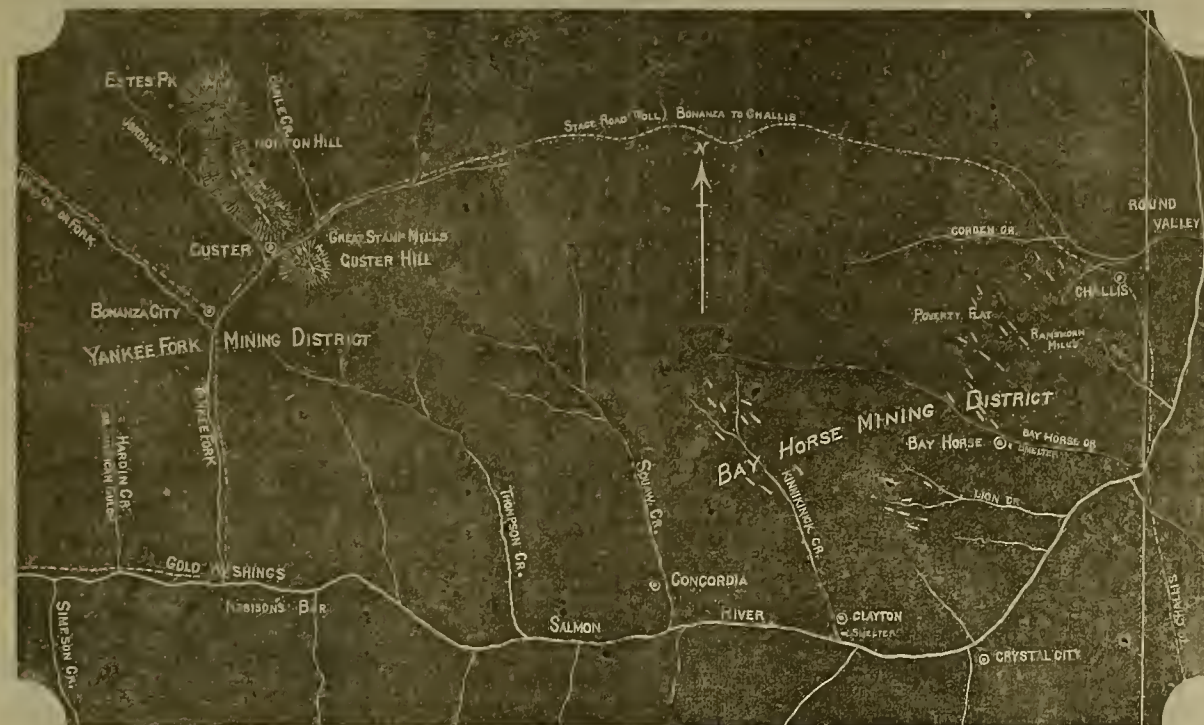
The River Channels

Have been largely contracted in width. The filling up of the present navigable rivers is threatened. The Yuba waters are so charged with debris that they are wholly unfit for watering cattle, domestic or other uses, unless first taken up and allowed to stand and settle. As it comes down to Marysville it is so charged with sand as to be unfit even for surface irrigation. Two dams for unbounding debris were constructed by the State, under the Drainage Act of 1880, at a cost of \$500,000. Both were destroyed. A dam made by the North Bloomfield Mining Company at Humboldt canyon is full, and the debris has passed over and filled the canyon and South Yuba to a level with the debris above, as if no dam existed. A dam across Sucker Flat ravine is in a similar condition. The plaintiff owns property in Marysville and two farming tracts on the Feather river. The latter have become useless through being buried by debris, and by an overflow, caused by debris, his Marysville property was injured in 1875. The level of the bed of the Yuba was elevated by these deposits above that of the basements of Marysville buildings, and as the water in them rises and falls with that of the river, they were rendered unfit for use and abandoned. The sewage was greatly obstructed by the same means.

The Filling Up by Debris

Caused a greater flood, with a smaller amount of water in 1875 than in 1881. In 1881 the inhabitants of Marysville were called out in the

(CONTINUED ON PAGE 28.)



YANKEE FORK AND BAY HORSE MINING DISTRICTS, IDAHO.

about fifteen tons taken from a forty-foot incline averaged, by smelting, \$260 per ton. The other mines on this lode are all similar, the ores being the same in general character and value. On Ramshorn mountain, and west of the Ramshorn mine, are located the Excelsior, Beardsley, Hood, Keno, Goodenough, River-view and Eagle Rock on Bay Horse creek; and Colorado Kid, Uncle Ben, Melrose and Head Light on Garden creek. The Excelsior is opened by two tunnels of 85 and 125 feet respectively. From the second or main working tunnel a crosscut 40 feet in length taps the whole length of the ore body, which is a high-grade carbonate; average assay of 90 ounces per ton. The other mines of this group on Bay Horse creek contain the same character of ore, but not of quite so high a grade.

The group on Garden creek, about 6 miles west of the town of Challis, are similar to the first named group. The formation here is lime. The Kinnikinick mines are represented by the Monitor, owned by Capt. C. B. Rustin; the Overland, owned by J. D. Wood & Co.; the Silver Moon, Lone Star, Ella and War Eagle, owned by different parties. The Squaw creek mines are principally owned by J. D. Murphy & Co., a New York City firm, Capt. C. B. Rustin and Messrs. Conover & Gantt. But little has been done the past season on any of the locations, but what has been done places them on a par with the best in this district. These mines, as also those on Kinnikinick creek, lie in limestone, the same belt as the Bay Horse and Garden creek properties. There are two

appearance of a vast quarry of quartz on the mountain side. A tunnel has recently been started to tap this immense ore clute at a depth of 250 feet below the surface.

The mine is connected with the mill by a Hallidie wire tramway. The mill contains thirty stamps. This mill ranks as the best and most convenient silver mill in the territory. The mine and mill are the property of Messrs. Haggin & Grayson, of San Francisco.

The General Custer ores, like most others in the district, are sulphurets of silver, carrying from 10 to 20 per cent. of their value in gold, and are treated by first chloridizing and then amalgamating in the ordinary way.

The Custer mine has produced about \$2,000,000 worth of bullion; the last year's production is reported to have been \$850,000. The ore producing this amount has been taken from open cuts.

The Unknown mine adjoins the Custer on the east, and is a continuation of the same ledge. The Bureka, Continental, and Badger lie eastward from the Unknown. The Badger is opened by about 1,800 feet of shafts, etc., and has yielded a large amount of high-grade ore; the production during 1882 was about \$30,000.

The Little Giant, Black Crystal, Three-timeloser, and Bluewing extend south from the Badger and are promising ledges. The Lucky Boy and Anna adjoin the Badger on the west.

On the opposite side of the Yankee Fork from the Custer mine, and about a mile distant, is the Charles Dickens mine, situated at an altitude of 7,300 feet, but accessible by a good

reduction facilities, which, when supplied, can not fail to attract attention to the district for its large production of bullion.

All the mining camps of Custer county, situated north of the Salmon river, procure their supplies from the town of Challis, which, from its location, is destined to be one of the leading towns of Idaho. It is situated in Round valley, which has a productive area of about 16,000 acres. Timber for charcoal and building purposes is abundant and in close proximity to the chief mines and smelters. In most cases, however, the roads must be graded along the base of the mountains to permit supplies to be brought to market.

Lane Lectures.

The second course of popular lectures at Cooper Medical College, corner Sacramento and Webster streets, San Francisco, will be delivered during the coming winter, according to the programme below. These lectures are free. No ticket of admission is required:

Programme of Lectures.—January 4, 1884, Professor C. Cushing, "The Influence of the Mind on the Body;" January 18, Professor H. Gibbons, Sr., "The Influence of the Body on the Mind;" February 1, Professor J. H. Wythe, "Diseases of Modern Civilization;" February 15, Professor C. N. Elinwood, "Progress in Medicine;" March 7, Professor J. O. Hirschfelder, "The Spinal Cord, with Experiments;" March 21, Professor W. D. Johnston, "Spectrum Analysis;" April 4, Professor Henry Gibbons, Jr., "Sleep and Sleeplessness;" April 18, Doctor J. F. Morse, "The Anesthetic Method;" May 2, Professor A. Birkan, "The Voice;" May 16, Professor L. C. Lane, "Food." The lectures are at 8 o'clock p. m.

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Ingersoll, E 3 1/2", beat National 3 1/2".....	321 " "
National beat Rand.....	139 " "

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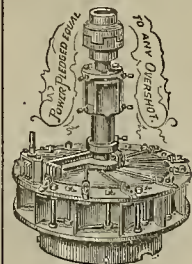
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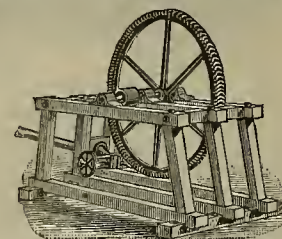
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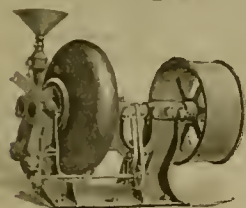
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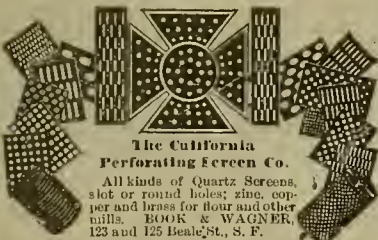
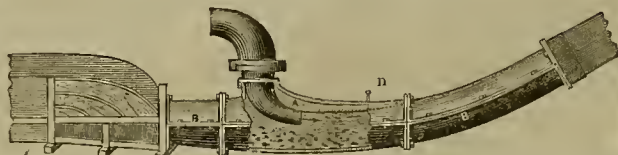
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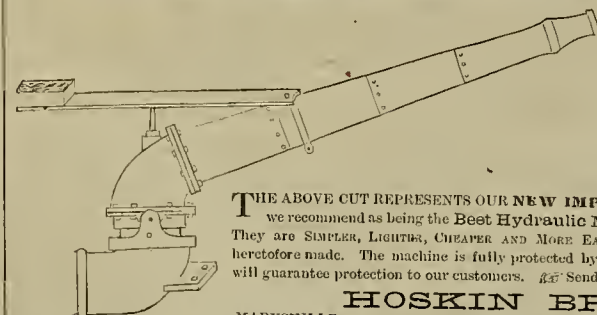
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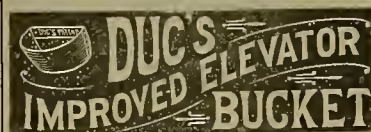
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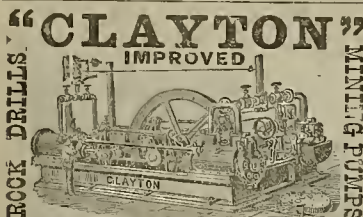
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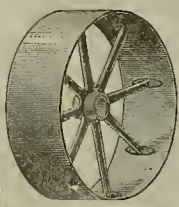
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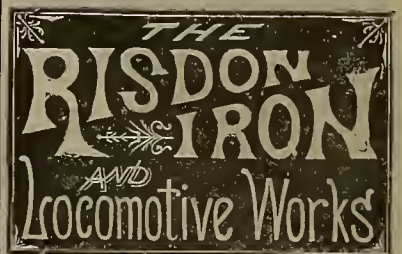
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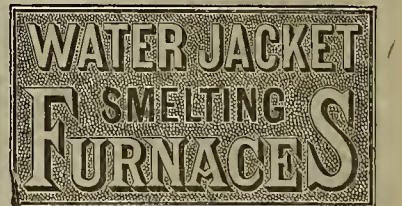
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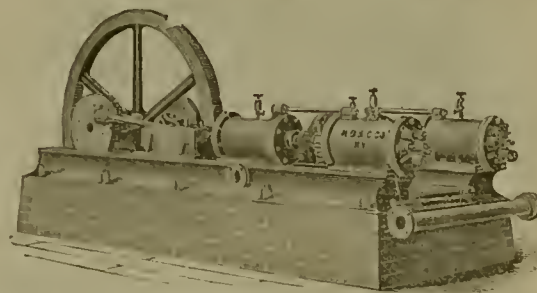
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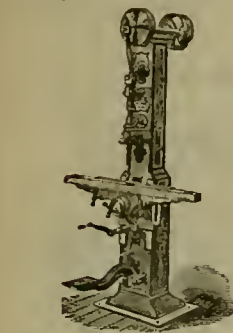
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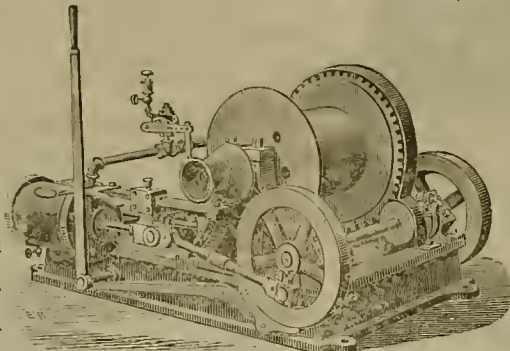


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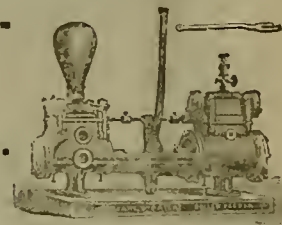
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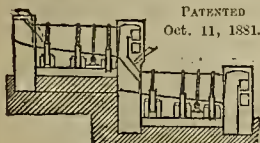
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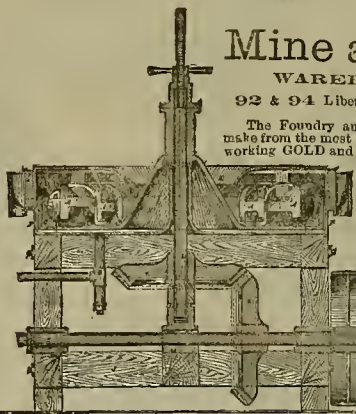
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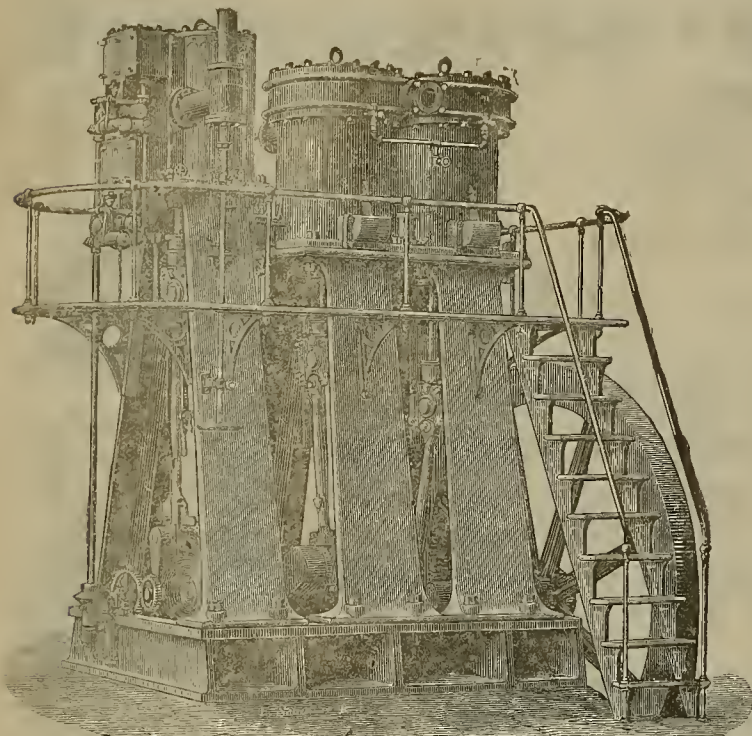
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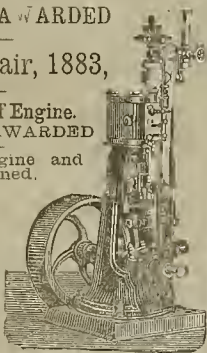
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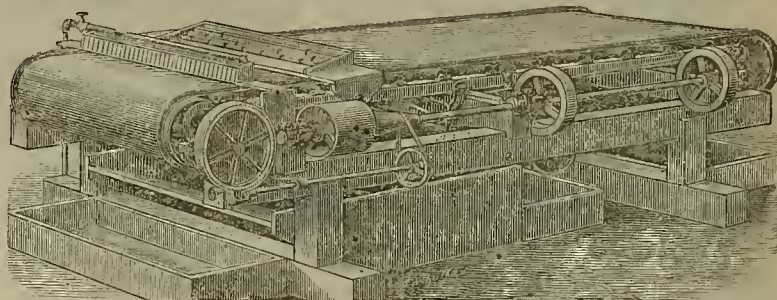


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BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 19, 1884.

VOLUME XLVIII
Number 3.

A Horse Power Hoisting Machine.

Among the more modern conveniences for the miner and prospector are the horse power hoisting machines, which are simpler in construction than the old fashioned horse-whim, and a long way ahead of the old hand windlass so common everywhere. We illustrate an improved form of horse power hoist, showing it placed for operation. It is designed for mining purposes or raising coal or water out of a shaft. It will raise a bucket or weight weighing from 500 to 700 pounds, 60 to 70 feet per minute. The machine is made entirely of iron and steel excepting the sills, and is not affected by dry or wet climates. The hoisting drum is under complete control of the man at the shaft, landing the bucket by operating the levers at hand, and by which means the drum can be thrown in and out of gear at will when the horse is in motion, or the bucket lowered by the brakes as safely and conveniently as by a steam power hoist. There are no clutches to throw out or in gear. The drum will carry 500 feet or more of $\frac{3}{4}$ inch steel wire rope. The machine is small, light, easily handled and durable, sufficiently strong to do the desired work, and so simple that it can be readily understood by any miner or person inexperienced with machinery. There is a safety attachment on the end of the drum in case of an accident, the dog always being in gear when the bucket is being raised. The agents for this coast, Messrs Parke & Lacy, No. 21 and 23 Fremont street, in this city, give the following directions for placing and working this machine, which at the same time shows its methods of operation.

Place the machine in position so that the center of the drum is opposite and at right angles with the sheaves on the gallows frame or tripod; dig small trenches six or eight inches deep to receive cross sills and cast bridge tree, and then stake or weigh down securely. Bolt on the shifting rods, and after obtaining distance, dig a trench and put down sufficiently deep; then fasten down securely a piece of timber; bolt down on the timber the casting to receive the shifting levers, and lower sheave, and place a plank or timber on each side of the levers and rope, bridging over for horses to pass. A gallows frame or tripod, whichever will be the most convenient for the place where the ma-

chine is to be worked, should then be put up, using two or more sheaves.

In working the machine, when the weight is raised high enough the brake lever is applied; then throw out the gear wheels by moving forward the gear lever; when the weight is lowered throw the wheels in gear, which will keep the weight any desired height. In working the power a breeching harness should be used, as is shown in the cut. Extra care should be taken to have the gear wheels kept close in gear, for if they are allowed to work open there is danger of breaking the teeth. To put the crown wheels closer in gear, tighten two nuts connected with the iron bridge tree, loosen the set-screw in the adjustable collar on the outer end of the drum, and turn the collar to the left until the wheels are close in gear; then tighten up the set-screw. To take up slack rope use the

machinery without great expense; so whatever is wanted is mostly transported in the summer. Since the extension of the railroad system to the south a wider market has opened for our machinery, which has, by the way, an excellent reputation for strength, design and durability. Arizona, New Mexico, and Mexico are supplied mainly from here. To the north, also, our machinery goes, and Oregon, Idaho and Montana have many examples of the work of the San Francisco mechanics.

The quartz mill machinery and appliances made by our local foundries and machine shops is noted for its strength and its perfect adaptation to the work to be done. They have had so many years experience in this kind of work that faulty designs, shapes or sizes have been eliminated, and only those which have stood the test of actual work satisfactorily are used.

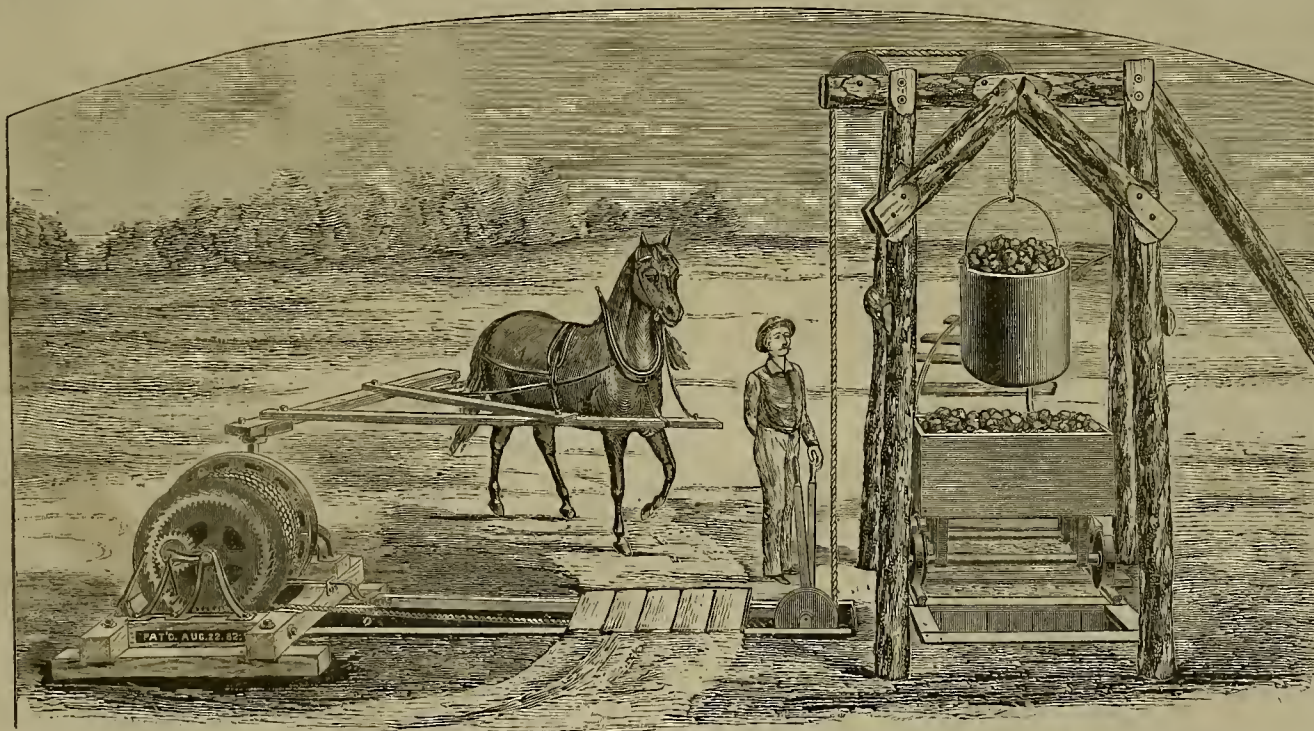
Be Hopeful.

Although the result of the mining debris litigation is calculated to make the hydraulic miners despondent, there is no reason to give up hope entirely, and to think that California mining is going to ruin. There are hundreds of quartz mines being worked where good miners may find employment. In fact, it is probable that an impetus will be given to quartz mining, because so many miners will want to engage in it. There are fields for the prospector in the southern part of the State, and the finding of one good mine often leads to the finding of others.

There are drift miners at work too, and no doubt there will be many more. The owners of hydraulic mines that have any specially rich strata, will work them by drifting, if they are

not allowed to hydraulic their whole deposit. And drift mines employ more men than those worked by the nozzle and the stream.

Quartz and drift mines will develop activity in many places. The men who are thrown out of work now, instead of idly bemoaning what might have been, should accept the fiat and do the next best thing. It is hard, of course, to have homes broken up and business disturbed. But it will do little good to despond. The effects of the decision are far-reaching, and



AN IMPROVED HORSE POWER HOISTING MACHINE FOR MINERS' USE.

crank on end of the drum. Should it not be convenient to place a whim close to the shaft, two extra levers and a casting can be furnished, and put on if required.

The dimensions and weight of the hoisting power are as follows: Drum, 22 inches long by 21 inches in diameter; bed frame, 5 feet 3 inches by 2 feet 9 inches in width; height, 10 inches; weight, 1,200 pounds.

Mining Machinery.

Just at this season of the year business at the foundries is apt to be dull, and no exception to the rule is apparent this year. There are few large jobs in hand at our local works. Of course all of them have more or less in the shops, but little very extensive work is being done. So much of the machinery made by our foundries is of the class of mining or metallurgical appliances, that when the mines are not active the foundries are not. So many mines are situated in mountainous regions that during the winter months it is impracticable to move

There is no better quartz crushing machinery in the world than a California mill. The pumping appliances in vogue are also made strong and durable, and are so constructed that the very best results are accomplished. The hoisting works of different kinds and patterns are solid, simple and admirably adapted for constant and safe use.

We have become noted of late for our furnaces for smelting lead and copper; and the ore-roasting furnace has reached perfection on this coast. As to the appliances of mining, such as cars, cages, buckets and all the dozens of things required, purchasers may be sure to get perfect types here. In fact, mining machinery of all kinds can be procured in this center, there being many agencies here for the sale of those articles not made here, and those made for the California trade are generally of the best class.

Ice in New York has floated up East river on Sunday and formed under the Brooklyn bridge, making a complete bridge between the two cities, the first time since 1875.

many only remotely connected with the industry affected will feel the result more or less. In a country like this, with a good climate, wonderful undeveloped resources, plenty of mines, and a great area, even the most unfortunate have much to look forward to. California is by no means played out. She yet retains the first place on the list of gold producers of the world, and the second in the total bullion product. Her mines are not all worked out; her forests are abundant, her fields are broad and fertile. The dwellers within her borders who cannot do one thing can do another. There is plenty for the willing hands to do. Many of the natural resources of the country are only partially developed. Men and muscle are wanted to bring them out. No one is going to starve in the midst of our plenty. It is better to look on the bright side of the subject and be hopeful, taking up whatever comes to hand, with the idea of bettering the condition by the means most available. While awaiting the final decision we can work as well as wait.

CORRESPONDENCE.

Saving Gold.

EDITORS PRESS:—In looking over the last report of the Director of the Mint, upon the statistics of the production of the precious metals, kindly sent me by Horatio C. Buchard, Esq., of Washington, D. C., I must say I was confronted by the extravagant losses entailed by the present old system of wet crushing (gold), stamp mortar and copper-plate amalgamation. This system I have been opposed to for many years, but it is dangerous for any Superintendent to scout at the present old method, for it would be at once thought that he wished to try some personal hobby of his own. But in the name of common sense let us have a fair discussion on this subject in a broad light, that all may be benefited; for it is too well known that by the old system of amalgamation, gold ores in the stamp mortars (more especially when the gold is fine) with quicksilver, causes flouing and granulation of this metal in the process of trituration. These minute globules of mercury become coated with impurities, causing a percentage of floured gold. The power of cohesion is lost, and while in this condition without the aid of settlers and chemicals, it is impossible to bring the mercury together in a mass, so that it passes away in the slimes. This is the main cause of the loss. By referring to the statistics I found that one of the oldest and best mining authorities, Mr. A. B. Paul, says: "We are not working to save gold but to crush rock. Our present general system of gold mining and milling is based upon the idea that gold is mainly coarse; while examination will show that the higher percentage is in atoms finer than flour itself. In my experiments gold has been taken up so fine that in distilled water it would not precipitate in less than five to ten minutes. [I can vouch myself for this statement.] Can you save this kind of gold by running water down stream? Again, can you obtain gold of this kind without minute reduction? Herein lies the secret of high assays before working, and small returns after."

Mr. Deetken, of Grass Valley, California, in order to determine the loss of gold by mill process tabulates a series of assays made of the tailings of ore from the best mills in the State, which shows the loss to have been 40 per cent. of the yield, of which the float loss was nearly 14 per cent. Fossett's table of seven years' work in Colorado shows an average value of the ore by assay to be \$37.97 per ton. The average value per ton saved by milling and smelting was \$14.50, showing a loss of \$23.47 per ton in gold and silver, or more than 60 per cent. Again, in the London *Quarterly Journal of Science*, in an article on the subject, it was stated that the gold caught on plates is, under the most favorable circumstances, only 40 per cent. of the assay value of the ore. Prof. Raymond has said, in a former report, that it is impossible to state accurately what percentage of gold is lost in milling; but that a very large amount is lost cannot be doubted. This loss probably varies from 30 to 70 per cent, according to the nature of the gold ore. "Fossett's Colorado," page 292: "It is estimated that more gold has been wasted in milling and has been washed down the creeks and gulches than has been saved." Then again, Albert Reichenbecker, a graduate of the German schools, an acknowledged authority in mining matters, says: "The proportion of gold saved on the plates and aprons varies in a well constructed mill between thirty and fifty per cent of the whole amount of gold in quartz, and may average forty per cent." Then again, Prof. Eggleston estimates the loss of between fifty and sixty per cent of the total yield of the ore.

I could cite numerous others on this question. Suffice it to say, however, that the best regulated mills lose a great deal in this age of scientific advancement which should not be lost. Some mill men advocate fine screens, say No. 60. My experience is that the loss is greater by reducing in stamp mortars the ore to such fineness, for the gold and mercury then become more floured, and pass off in the slimes, thereby increasing the loss, which no copper plates will catch, even if electro-plated with silver or gold.

I have given practical attention to the reduction of gold ores for the past thirty years, and find myself following the old system with very few improvements, but not as a matter of choice. It is so hard to introduce anything new, prejudice going always against one. I hardly dare to adopt a plan that is far surer and safer, because it would be at once considered a "hobby." So let us unite, exchange ideas, and see what can be done to lessen the evil. The matter must be faced, and I feel sure can be successfully combated. We have tried the old system long enough. Of course there are legions of patented mills, concentrators, amalgamators, etc., but so far what do they amount to if there is no general system pronounced by trial of time, and in all conditions, to be perfect?

My idea of the matter I will suggest in a very few words. Crush your ore coarse enough not to bruise up your sulphurets too fine, so that they may be readily caught, say by a true concentrator, which is as good a machine as is made for my purpose. First of all, the most important point, do away entirely with stamp mortar amalgamation. After the base metals

have been saved by concentration pass the residue through pans, and there amalgamate. I prefer my own pans, as they are self-discharging. They grind and amalgamate perfectly, and do not flout the mercury, reducing the pulp to thin paste. Then let the overflow or slimes pass into wooden settlers with revolving agitators; then, by careful manipulation, at least ninety per cent will be saved.

I am, from what little I know of Morris' system, inclined to think well of his process; but he must demonstrate by actual working tests of large quantities, that his method is what it claims to be. There can be no better moment than at present—when we have to face known losses by the old system. It is not too much, perhaps, for me to say that our mill is as perfect a gold saver as the old appliances permit. From assays made I am not losing a very great percentage, but there is no reason why that loss may not be saved. I trust the remarks I have made will be taken up by others, and their opinions fully expressed with the one object in view of a common good. I have lately visited all the principal mills in Calaveras and Amador counties, and failed to find anything but the old system in vogue.

W. F. DRAKE, Superintendent.

Patterson Mine, Tuttle town, Tuolumne Co., Cal.

Prehistoric Animal Remains.

EDITORS PRESS:—For several years I have been of the opinion that a one horned herbiferous animal existed in remote antiquity, or more probably before antiquity began, of such gigantic proportions that the elephant, or even the mastodon, were pigmies in comparison. Some years ago the fore leg bone of a monster animal was unearthed at Lagrange, in this county, from a hydraulic mine. It was nearly three feet in length, about three in circumference at the knee and near two feet at the smallest end. I believe it was sent to San Francisco.

A few years after the discovery of the bone, an individual exhibited an ivory tusk, or more properly a horn, on Dry creek, about eleven miles southeast of the town of Oakdale. The finder succeeded in unearthing between ten and eleven feet of the horn. It was forty-five inches at the large end in circumference, and nine inches in diameter at the small end. Both ends were evidently broken off. The horn was much decayed and had crumbled away to a great extent and must have been a great deal larger and longer when the animal carried it.

A few years after the finding of this horn, a son of Dr. Booth, of Oakdale, discovered, about two and a half miles west of where the large horn was dug up, on a branch of Dry creek, the baby of the large animal who sported the large horn. The bones were embedded in a coarse hardpan, and the water of the creek had washed the vegetable matter, or mold, and gravel away, leaving the head and most of the fore-quarters of the animal exposed to view. The head was downstream. Its shape, formation and size could be plainly discerned, and the position of the horn, in reference to the nasal bones, was well defined. The horn was attached to the head about eighteen inches above the end of the nose, and was about five inches in diameter where it started out. I succeeded in unearthing four feet of it, to where it entered a conglomerate strata, but it soon crumbled into small pieces. The head resembled the rhinoceros more than the elephant. It had not the vaulted and cellular skull of the latter animal. In size the head was much larger than a half barrel, and considerably longer (it was actually much larger than I describe it). The lower jaw was gone, but four molars, two large and two small, were left. The larger ones were five by six inches on the surface. The enamel was as bright and perfect as when the animal was living. The smaller were evidently of no use to the animal. They appeared to have been inserted about five inches in the jaw. The fore leg bones were twenty inches long. I have one of the molar teeth in my possession now, and some of the fragments of the bones. The large horn first mentioned would weigh in the life of the animal fully 150 pounds.

I have no doubt that this huge monster was a distinct species never before discovered or described. The facts I have briefly attempted to give can be verified by a number of witnesses. The large horn was taken to Stockton, where little attention was paid to it, and the finder was accidentally killed. What became of it I am unable to state.

L. M. B.

Oakdale, Cal.

Response to Mr. Bowles.

EDITORS PRESS:—I think there can be no doubt that Mr. Bowles is right and I was wrong as to the precipitation of gold from a solution of the tetrachloride by manganese protochloride. The idea must have arisen from the general truth that the lower chlorides of metals which can form higher chlorides, do precipitate gold. Possibly manganese protochloride may do it at a very low temperature, I have not time to try it. Score "1" for Bowles, and now for the other charge.

To "back" against Fresenius would require some courage; but when Fresenius and fact are both arrayed against one marshaled by so gallant a young officer as Mr. Bowles, what can one do but surrender at discretion. But *festina lente*; poco a poco anda lejos; regards de plus pres. Let us see if we had formally occupied the position which is so vigorously assaulted,

or whether we had only a *corps d'observation* stationed there for precautionary purposes.

The article referred to by Mr. Bowles is not at hand; but from his quotation it appears that I said "it seems possible," etc., the apparent possibility being suggested by the previously stated fact that copper sulphide is oxidized into sulphate by contact with gold perchloride. Having made one mistake through a want of caution, I may surely be permitted thus to guard against another. It may be that the gold in the mixed solution is all precipitated first, but if it is not, and we stop short of saturation of the leach with hydrogen sulphide, I see no reason why metallic gold and copper sulphate might not be produced. I must again plead want of time for experiment, but I am not aware of any law compelling us to saturate our liquor with H. S. And I think it might be "readily seen that gold in the presence of a copper salt may be precipitated in metallic state" by means of hydrogen sulphide, simply thus: By using copper sulphide to throw the gold down, said copper sulphide being produced and reproduced by means of hydrogen sulphide.

Prescott, A. T.

C. H. AARON.

Mineral or Agricultural Lands.

Following is the text of a recent ruling of the Commissioner-General of the Land Office, relating to agricultural and mineral lands in Santa Clara county. It will be seen that the land office at Washington sustains the decision of the Register and Receiver of the San Francisco District:

DECEMBER 18, 1883.

Register and Receiver, San Francisco, Cal.—GENTLEMEN: In the matter of the Santa Clara Mining Association of Baltimore vs. Giacomo Scursur, B. Scursur and Michael Sadielovich et al., being a contest to determine whether certain portions of Sections 30 and 31, Township 8 S., range 1 E., of Sections 25 and 36, Township 8 S., range 1 W., and of Section 1, Township 9 S., range 1 W., are more valuable for minerals or as agricultural land, before me on appeal from your decision of April 30, 1883, holding the land in question more valuable for minerals, the evidence has been carefully considered. It would appear from the record in the absence of all showing to the contrary, that due notice was given to all parties. Said evidence is voluminous, comprising about 800 pages of testimony, besides maps, diagrams, photographic views, etc., and is largely corroborative and cumulative.

The lands which are the subject of controversy aggregate 957.32 acres, lying in Santa Clara county, California, within sixty miles of San Francisco and near the city of San Jose. They are in the form of a peninsula lying between Capitancillos creek and a branch thereof, and contiguous on the north and east to the Guadalupe Quicksilver mine, the property of the above association, and one among the largest and most valuable of its kind in the world. From the confluence of said streams on the north, the lands extend southward, a mountainous region of ridges, ravines and canyons, becoming very wild and rough towards the southern and western extremities. This general description is based upon the testimony of both parties.

The official field notes or survey of the townships containing such lands, approved March 24, 1880, described them in general terms as "very rough third rate" with some "liveoak, hickory, oak and very dense brush and chaparral." The witnesses on the part of the mineral claimants are assayers, mining surveyors and engineers, mining experts, the township assessor, practical miners and the neighboring farmers; on the part of the agricultural claimants, neighboring farmers, claimants and others, nearly all of whom are without experience in mining, and none claiming expert knowledge of minerals or mining. The evidence for the mineral claimants shows that within a distance of four miles lie the New Almaden, Henriquita and Guadalupe quicksilver mines, all valuable and extensively worked properties, the first named being the second in size and value in the world; that the lands in question are between the Guadalupe and Henriquita, the latter being about two miles from the former, the New Almaden, lying still beyond in the same line; that ore valued at \$1,500,000 has been taken from the Guadalupe mine, that several tunnels from said Guadalupe mine into the lands in question, two of them to a distance of several hundred feet each, that ore to the value of \$100,000 has been mined from these several tunnels within the limits of said land, and an equal amount expended therein in mining operations; that said land lies in a mineral belt directly in the trend of a noted mineral formation; that three distinct lodes of mineral enter said lands; that the outcroppings of these lodes are in many places bold and strong, and afford specimens of mineral-bearing rock of the same nature as those found on the surface of the mines aforesaid; that, although cultivation of small areas within said land has been several times attempted during the past twenty years, such attempts have been from time to time abandoned, and that said lands possess no material value aside from their value as mineral lands, for which they are very valuable. The testimony on behalf of the agricultural claimants is to the effect that the lands in question, though quite rough and broken, contain many lots that can be cultivated profitably, especially by devoting

them to vine and fruit culture; that various small lots are now cultivated, crops have been grown and parties are resident thereon; that any considerable workings on said land are of recent origin, and occupy but a small portion of said land adjacent to the Guadalupe mine, and that these lands are more valuable for agricultural than mining purposes. It is urged on the part of the parties last named that the fact that, with the exception above noted, no portions of said lands have been profitably mined, or during recent years attempted to be mined, being at the same time near to the great cities in a county where mining has for years been a chief occupation and resource of the people, should be proof conclusive that said lands are not valuable for minerals; but, giving the argument its full weight, a similar one, it seems to me, will, under the circumstances of the case, apply with equal force to controvert the claim that these lands have any considerable value for agricultural purposes.

The association and its predecessors in interest have been extensively mining for many years in the Guadalupe mine, to which these lands have been regarded as an adjunct. A company can not be called upon to work several portions of its claims at the same time. The Township Assessor, corroborated by many parties, testifies that said lands are very poor, have no value from a farmer's standpoint except for grazing, and that two-thirds of the land would be dear at \$1 per acre. The agricultural claimants uniformly place the value of the uncleared land at \$30 per acre for agricultural purposes. The general topography of the tract in question, even in a region where farming lands are very valuable, is almost conclusive against any such valuation as last named.

There can be no reasonable doubt, I think, from the evidence before me, that three large and well defined mineral ledges enter said lands, and the presumption that they continue within and may be profitably mined, making with their spurs and connections the said lands much more valuable for mineral than for agricultural purposes, is too strong to allow the agricultural claimants, under the law, to prevail. Your decision is accordingly affirmed and you will hold said lands subject to the provisions of the mining laws.

Please notify the parties in interest, allow the usual time for appeal, and report further as circumstances may require. Very respectfully,
N. C. McFARLAND, Commissioner.

Winter in the Cœur D'Alenes.

J. B. Carpenter gave to a *Helena Herald* reporter some interesting items from the Cœur D'Alene mines he had recently left. Eagle City is the center and local point of the diggings. It has 20 cabins, put up during the autumn months. November and December have been in the main stormy months, and such a thing as getting out and in has been to many a desperate undertaking. At Pritchard Creek camp the snow for weeks has been deep, and it has been next to impossible to get out logs or building material of any kind. The trail to and from the mines at this time is dangerous, and within the past 60 days numbers of lives of men and horses have been sacrificed to cold and snow, and the river fords and quicksand encountered on the way. Of the several hundred fortune hunters who reached Pritchard creek during the fall, not to exceed 100 remains to be wintered there. For the few only who are now there is subsistence sure and shelter sufficient. Communication with points on the lake and railroad is too precarious for any considerable number to think of wintering this year in the mines. The matter of supplies is the serious drawback, and in this particular no considerable relief can be expected till well along in the spring months. At Eagle City flour is worth 20 cents per pound; bacon, 40 cents; sugar, 75; beans, 40; butter, \$1.50; beef and venison, 25, with little to be had, and other necessities scarce and correspondingly high.

Mr. Carpenter is enthusiastic as to the future of the Cœur d'Alene section, to which he intends to return in the spring. It is a great mineral country, abounding not only in placers, but in gold and silver ores. He has with him specimens of free gold-bearing quartz and samples of galena ore, all taken from the mountains bordering on Pritchard creek. He also shows nearly two ounces of coarse gold washed from what is known as the Widow's claim—an average exhibit worth about \$18 an ounce. The heaviest piece in the collection weighs \$3; but from the same ground, he states, have come very large nuggets; one weighs \$300. Mr. Carpenter is confident that another year will see a big placer camp producing immense treasure in the Pritchard creek section.

THERE are whole mountains of ore in Eureka district that are not profitable to reduce by smelting, but which would yield handsome fortunes if treated by milling process. It has already been amply proved that there are mines out of number, not only here, but in adjoining districts, which would give splendid returns to capitalists who would purchase them and erect mills for the treatment of the ores. Milling business alone, independent of mine owning, would prove an immensely profitable enterprise.

J. C. PLUNKET, Esq., who makes a specialty of mining law, is now well located in the new building on the north-east corner of Broadway, Oakland.

MECHANICAL PROGRESS.

Brazing Band Saws.

There appears to be a growing fashion for brazing band saws with glass blowpipes, and as a maker I am continually being asked for apparatus for this purpose. It is not possible to reply privately to all, and no doubt some information on this point will be useful to your readers. If gas is once used to braze a band saw, its use is continued as a matter of convenience, and after a short time breakages gradually increase in number. As these do not occur exactly at the joint, no blame is attached to the use of gas, and the cause of continual failures is rarely if ever discovered. It is well known that a gas flame not only scales steel deeply, but also destroys the nature by burning the carbon out, and this occurs specially at the edge of the flame. Band saws brazed by gas almost invariably break again at a point some little distance from the previous fracture, at a point where the outer edge of the flame has damaged the metal. A large proportion of the users seem to be completely puzzled as to the method of repairing easily. The only really satisfactory way is to make a thick, heavy pair of tongs red hot and clamp the joint with them. The heat melts the spelter instantly, and makes a good joint without scaling or damaging the steel. For a joint which has to stand constant heavy strains and bending, it is better to use an alloy of equal parts of coin silver and copper, melted together and rolled out thin. This alloy never burns, cannot be overheated, and makes first-rate joints which will stand hammering and bending to almost any extent.—*Engineering.*

POLE RAILROADS appear to be coming into quite extensive service in some parts of the country, as is shown by the fact that a manufactory has been established at Nashville, Tenn., for "pole road locomotives." This locomotive, which was invented by Mr. W. K. Cole, of Montgomery, Ala., about a year ago, is furnished with grooved wheels to be run on wooden poles, instead of metallic track. It is similar in appearance to the locomotives in use on narrow gauge roads. The Nashville American says of the invention: "The pole road is wonderfully cheap, and is especially adapted for hauling in the lumber regions. The track is not a permanent one, the poles being merely fastened down with wooden pegs. Ten miles can be laid down in one direction in one day, and taken up and laid in another direction the next. The engines, which will be made by the new company, will be capable of pulling up a grade of 400 feet to the mile about four times what an ordinary freight or passenger engine is capable of. The convenience of an engine and road of this kind for use for hauling timber in mountainous regions is obvious. The wheels are so arranged as to have a lateral play of eight inches, thus being adaptable to either a broad or narrow-gauge road. To admit of this play-chains are used instead of rods as drivers. An average speed of fifteen miles per hour can be obtained."

WONDERFUL INVENTION IN TELEGRAPHY.—There has recently been perfected, after some three years of patient study and investigation, an invention that bids fair to revolutionize the present method of telegraphic transmission of dispatches. It is called the Synchronous Multiplex System of Telegraphy, and the inventor is Mr. Patrick B. Delany, of New York. Briefly stated, the result of Mr. Delany's discovery is to enable numerous telegraphic dispatches to be simultaneously transmitted over one telegraph wire. Hitherto, the greatest number that could be so sent was limited to four, as in the well known quadruplex system, but in the synchronous-multiplex system the division of a single line has been carried as far as seventy-two, and the limit in this direction does not yet appear to have been reached. The value of the discovery will by no means be diminished when it is known that in the synchronism system, unlike the quadruplex system, these messages can be sent either all in the same direction, or any number in one direction, and the remainder in the opposite direction.

AN INTERESTING DISCOVERY.—Prof. Calvert has recently made the interesting discovery by practical tests that the carbonates of potash and soda possess the same property of protecting iron and steel from rust as do those alkalies in a caustic state. Thus it is found that if an iron blade be immersed in a solution of either of the above carbonates, it exercises so protective an action that that portion of the iron which is exposed to the influence of the damp atmospheric air does not oxidize, even after so extended a period as two years. Similar results, it appears, have also been obtained with sea water, on adding to the same the carbonates of potash or soda in suitable proportion.

A COTTON PICKING MACHINE.—The first bale of cotton ever picked from a field by machinery was exhibited Oct. 30, 1883, at the Charleston Cotton Exchange, and attracted general attention. The condition of the cotton is pronounced by cotton men to be as good as the hand-picked. The cotton has the same grade. What a world of thought, anxiety and wealth has been expended to secure the above noted result, and what a change it will produce in the agricultural labor of the South. It is to the cotton planter

of the South what the grain reaper is to the farmer of the North and West. The mechanical cotton picker will not stoiko or go off to camp-meeting when the crop is ready for harvest, but will take the place of thousands of too often indolent colored laborers. It will in the end prove a blessing to the colored people of the South, for they will be compelled to seek other channels of labor which will require of them greater cultivation and use of their mental faculties.

A NEW USE FOR MILD STEEL.—An English exchange says: "Attention is being drawn to the use of mild cast steel for stern-frames, rudders, etc. The steamer Euripides, now in a Liverpool graving dock, after running on a reef of bowlders, is found to have sustained no damage to her stern or stern-frame, except that there are indentations in the material. The stern is unaltered in shape. The cause is to be found in the fact that there was no weld, the structure being in each case one piece of solid cast steel. Competent judges believe that the solid mild steel stern saved the vessel from loss. It is stated the licensee for the make of these articles can sell the new solid articles cheaper than the old fashioned riveted ones."

A NEW NAIL MACHINE.—A new self-feeding attachment for nail machines, in experimental use at Brown, Bonnell & Co.'s works, Youngstown, Ohio, is well spoken of. It is claimed that it is capable of feeding a plate of any size used in the manufacture of nails, and that it is a clean and true feeder, as shown in ten hours' work a few days since, when the machine to which it was attached cut twelve kegs of seven-penny nails. It is stated that other machines in the works will be supplied with this feeder as soon as the feeders can be furnished. They cost \$80 each. The inventor is Mr. J. H. Dunbar, machinist at the works mentioned.

FRICTION.—Professor Thurston states that the co-efficient of friction of lubricated surfaces under pressure, as given in text books, are much too high; instead of 4 to 7 per cent, as generally stated, he has obtained as low as one-fourth of 1 per cent with sperm oil. This, he says, is the best he ever found for heavy pressures, and he has made experiments all the way from very light up to 1,500 pounds per inch of surface. The crank pins of beam engines on steamboats, where 1,000 pounds pressure to the square inch is not uncommon, run as low as one-half of 1 per cent for the friction.

INCREASING THE POWER OF A BELT.—The usual ways of adding to the transmitting power of belts are by applying to them oil, rosin or some adhesive substance, and by tightening them on the pulleys. The use of oil, rosin, etc., results in a direct waste of power, for as it gets old it becomes gummy, and the belt sticks to the pulley, requiring a more considerable power than is generally supposed to separate it, and effectually neutralizes all the advantage sought to be gained by its use.

WOOD KNOTS. Wood knots are in great demand, to meet the increased esthetic taste of the day. They are subjected to a steaming process which softens them and develops their color, and are then used in exceptionally fine veneering. Persons who are experts in judging what knots are of value make considerable money by going about looking for them. Two were recently shipped to New York from California, in that State, which weighed respectively 1,150 and 1,490 pounds.

TESTING PLANE KNIVES.—A set of new knives should be carefully tested to see that they are correctly balanced and kept so. A knife slightly out of balance throws the cylinder out, makes rough work and wears the bearing. This, when once started, grows rapidly worse, and getting the knives back to balance does not remedy the matter. Both the spindle and boxes are brought to that state where a machinist's services are necessary to return and balance the cylinder.

BONES, BEARINGS AND JOINTS.—Crank pin boxes and main shaft bearings should be of phosphor bronze bearing metal or of good gun metal (copper and tin), or genuine Babbit. The journals should be accurately in line, and the fit should be close enough to allow the flow of oil to pass. If too tight they will heat and sweat; if too loose, they will pound and wear, and if out of line they will do all three.

A NEW HORSE SHOE.—An English mechanic has invented a horse-shoe composed of three thicknesses of cowhide compressed into a steel mold and subjected to a chemical preparation. It will last longer than the common shoe, weighs only one-fourth as much, does not split the hoofs, requires no calks, and is very elastic.

GAS ENGINES from one-fourth horse-power to 80 horse-power are now made. Medium sized gas engines, say 16 horse-power, will run on a consumption of fuel equal to 1 1-5 pounds of coal per horse-power per hour, which is about one-half the fuel required for the most economical steam engines of the largest size.

STRENGTH OF PAPER.—One of the most wonderful things about paper is its strength. As an illustration of this, a Bank of England note twisted into a kind of rope can suspend as much as 329 pounds upon one end of it and not be injured in the least.

SCIENTIFIC PROGRESS.

The Solar Atmosphere.

Professor Young, a well-known American authority, says that it seems demonstrated, as a consequence of the low mean density of the sun, and its great force of gravity, that the central portions of that body, and, in fact, all but a comparatively thin shell near the surface, must be in a gaseous condition, and the gases at so high a temperature as to remain for the most part dissociated from each other and incapable of chemical interaction. Under the influence of the great pressure and high temperature, however, their density and viscosity are probably such as to render their mechanical behavior more like that of such substances as tar or honey than that of air, as we are familiar with it. The visible surface of the sun, the photosphere, is composed of clouds formed by condensation and combination of such of the solar gases as are cooled sufficiently by their radiation into space. These clouds are suspended in the mass of uncondensed gases, like the clouds in our own atmosphere. The liquid and solid particles of which they are made up descend continually, their places being constantly supplied by fresh condensation from the ascending currents which rise between the cloud columns. From the under surface of the photosphere there must be an immense precipitation of what may be called "solar rain and snow," which descends into the gaseous core, and by the internal heat is re-evaporated, decomposed and restored to its original gaseous condition. The thickness of the photospheric shell, judging from the phenomena of the spots, can hardly be less than 10,000 miles. The weight of the cloud-shell, and the resistance offered to the descending products of condensation, act to produce on the inclosed gaseous core a constricting pressure, which forces the gases upward through the intervals between the clouds with great velocity, so that jets or blasts of heated gas continually ascend all over the sun's surface, the same material subsequently redescending in the cloud-columns, partly condensed into solid or liquid particles, and partly uncondensed. The layer of uncondensed gases which overlies the photosphere, or crust, is called the "chromosphere," the lower portion of which is rich in all the vapors and gases which enter into the sun's composition; but at a comparatively small height the denser and less permanent gases disappear, leaving in the upper regions only hydrogen and some other unidentified substances.

The dark lines of the solar spectrum originate mainly in the absorption produced by the dense gases which bathe the photospheric clouds, and these metallic vapors are only occasionally carried into the upper regions by ascending jets of unusual violence. When this occurs it is almost invariably in connection with a solar spot. The prominences are merely heated masses of the hydrogen and other chromospheric gases, carried to a considerable height by the ascending currents, and apparently floating in the "coronal atmosphere," which interpenetrates and overtops the chromosphere. As to sun spots, there can be no longer any doubt that they are cavities in the upper surface of the photosphere, and that their darkness is due simply to the absorbing action of the gases and vapors which fill them. It is also certain that very commonly, if not invariably, there is a violent uprush of hydrogen and metallic vapors all around the outer edge of the penumbra, and a considerable depression of the chromosphere over the center of the spot; probably there is also a descending current through its center. As to the cause of the spots and the interpretation of their telescopic details, he admits being unsatisfied; and as to the periodicity of the spots, he is unable to think it due to any planetary action—at least the evidence appears to be wholly insufficient as yet. The only peculiarity in his views lies, he believes, in the importance he assigns to the effects of the descending products of condensation, which, he conceives, form virtually a sort of contracting skin, producing pressure upon the gaseous mass beneath, somewhat as the film of a bubble compresses the inclosed air. To this pressure, thus produced, he ascribes mainly the eruptive phenomena of the chromosphere and prominences.

Philosophy of Creosoting Timber.

As is well known, the preservative properties of creosote are owing to its preventing the absorption of the atmosphere in any form, or under any change of temperature. It is noxious to animal or vegetable life; and it arrests all fermentation of the sap, which is one of the primary causes of dry rot and other species of decay in timber. The action of creosote—says Mr. Bale, in his work on "Saw Mills: Their Arrangement and Management"—may be thus described: When injected into a piece of wood, the creosote coagulates the albumen, thus preventing any putrefactive decomposition; and the bituminous oils enter the whole of the capillary tubes, incasing the woody fiber as with a shield and closing up the whole of the pores, so as to entirely exclude both moisture (water) and air. By using creosote, inferior porous timber and that cut at the wrong season, and therefore sappy, may be rendered durable. The Bethell system of creosoting is as follows: The timber is first thoroughly seasoned and cut to

the required dimensions. It is then placed in a wrought iron cylinder, fitted with doors that can be hermetically closed by means of wrought iron clamps. The air and moisture contained in the wood are then exhausted from it, and from the cylinder, by means of a powerful air pump. The pores of the wood being now empty, the preservation material (creosote oil) is admitted into the tank. When the wood has received all that it will after this manner, more oil is forced into it by means of hydrostatic pumps, exerting a pressure of 120 pounds to 200 pounds per square inch. This pressure is maintained until it appears that the proper quantity of creosote oil has been absorbed by the wood, which is determined by a gauge. Timber intended for railway sleepers, bridges, etc., should absorb seven pounds of oil per cubic foot; and timber required to be protected against marine insects, etc., requires at least 10 pounds of oil per cubic foot. The cost varies from 4d. to 5d. per cubic foot, according to the quantity of oil required.

WIRE FENCE TELEGRAPHING.—An experimental work has been going on for a short time along the Milwaukee and St. Paul Railroad Branch and the Brandon Branch, about thirty miles in length, the object being to determine whether or not the barbed wire of the fence on either side of the road can be utilized for telegraphic purposes. The fence wire was placed in proper condition for a sufficient distance to make a satisfactory test, the wire being run under the surface at road crossings. Superintendent of Telegraph Simpson decides that the plan is not practicable. Telegraph work can be done over the fence wire at this time, he says, but during the winter months, when huge snow banks completely cover the fence, the line would be made useless. There are thousands of miles of wire fence along the Western lines, and it has been contended that they should be utilized for this purpose.

PURITY OF THE ATMOSPHERE.—Two scientific investigators, one Swiss and the other French, have been analyzing the Alpine air. They ascertained that entirely pure air is not found until an altitude is reached of from six to thirteen thousand feet above the level of the sea. The atmosphere around the lakes below that level, however pure and beautiful apparently, was found to contain bacteria. Nevertheless, it was pure enough by comparison with that of the French capital, where the bacteria contained in a square foot of air are seven thousand times more numerous than those in the same quantity of air in one of the Swiss valleys.

CHLOROPHYLL IN ANIMALS.—Dr. Sedgwick gives a well written synopsis of the results of the more important recent studies concerning the occurrence of chlorophyll in animals, and its significance. These seem to show that the so-called "animal chlorophyll" has no actual existence, being in every case (possibly excepting Hydra and Spongilla) connected with a vegetable structure living in the tissues of the animal. This association of plant and animal, in the mutual benefits derived, is held to be somewhat different from the so-called parasitism known in lichens; but it is hard to see in what important respect the two cases differ.

OCEAN WAVES caused by earthquakes sometimes exert a tremendous momentary force upon the shores of the sea, although their geological action is small compared with the incessantly operating of the small waves. At the Lisbon earthquake of 1775, the oceanic wave had a height along the Tagus of forty feet, at Cadiz of sixty feet, and on the shores of Madeira of eighteen feet. The earthquake in 1746, in Peru, produced a wave which carried a frigate several miles inland, deluging the city of Lima at a distance of several miles from the coast.

TO AVOID PETROLEUM EXPLOSIONS.—With a view of avoiding explosions, M. Schlumberger recommends that a bottle of ammonia should be placed in each barrel of petroleum. On ignition, by accident or otherwise, the bottle would break, and the ammoniacal vapors would at once extinguish the fire. Dr. Pietra Santa proposes to apply this method to collieries liable to fire-damp. Tanks filled with ammonia would, it is said, stop the combustion, as it could not continue in an ammoniacal atmosphere.

The height and velocity of clouds have been determined in England by means of photography. Two cameras, placed about 600 feet apart, are provided with instantaneous shutters simultaneously released by electricity. The observer measures the angle of inclination of the cameras and the position of the cloud as photographed on the two plates, and from these data a trigonometric calculation gives the distance and height of a cloud with great accuracy.

CHLORINE AS PLANT FOOD.—A German exchange says that chlorine is a very important nutrient for plants. To all appearances the chloride of potassium exceeds the nitrate in nutritive value as long as the quantity does not exceed a definite limit. When there is too much of the chloride, the quantity of chlorophyll decreases, the plants ripen sooner, but the oxalic acid increases in quantity. In fact, it acts just like hydrochloric acid would.

PROFESSOR BERTELMINT maintains that the true element of carbon is as yet unknown; that it must be of a gaseous nature, and that diamond, graphite, etc., are but states of the veritable carbon.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

IOWA.—*Ledger*, Jan. 12: Some idea of the unprecedented richness of the rock obtained from this claim at Sutter Creek may be gathered when we state that the last crushing, consisting of about 20 tons, averaged \$430 per ton. The run before that, also aggregating over 20 tons, yielded at the rate of \$1,000 per ton. This was taken out at a depth of 100 feet from the surface. This splendid ore streak is not yet exhausted, and it is estimated that the rock in sight will pay \$400 per ton; how much of it there is remains to be proved. No underground work is being done at present. A substantial building is being erected over the shaft; also a patent one-horse whim, which will be sufficient for hoisting purposes until the shaft reaches a depth of 300 feet.

NOTES.—A. Guisto has commenced hydraulicizing on his gravel claim at Oneida Flat, which has been idle for months on account of scarcity of water. Tom Fullen has leased the Amador Queen quartz mine in Hunt's Gulch from J. Morgan, and is hard at work developing it. The Amador Canal Co. are putting in new tanks at the Tanner reservoir, to supply the Zeile and other mines south. I. N. Dewitt is busily engaged stripping ground on his mining claim at Murphy's Ridge. The Talisman mill was started Monday on rock from the South Spring hill. Work is progressing on the old Markly mine, on Dry creek, about five miles from town.

VOLCANO.—*Dispatch*, Jan. 12: Since the last rains business begins to look up, especially mining. They are taking very rich rock out of the south shaft of the Downs mine, and are running twenty stamps day and night. Gillick & Phillips are getting out some of the richest-looking rock that has ever been seen around this locality. They have been waiting for water to start the mill. The Canvin mine is getting out good rock. The Tunnel Co. is only running part of the time, owing to the scarcity of water.

SR. JULIEN.—There has been but little rock taken out of the St. Julien mine for several days past, as the workmen are engaged in arranging the interior of the mine so that they can work to advantage. The prospect still continues to look well, however.

QUARTZ MILL BURNED.—The quartz mill at the Stewart mine, near the West Point bridge, was destroyed by fire a week ago Sunday night. The loss is estimated at \$5,000, but it was covered by insurance to the amount of \$2,000.

NEW HOISTING WORKS.—The Seaton Mining Co. are putting up new hoisting works a short distance above their mill, near Drytown. The work is being done by Messrs. Reese and Brown, of Sutter Creek.

Calaveras.

RAILROAD FLAT.—*Chronicle*, Jan. 12: The mining interests of this place are improving. Mr. Edward Kerrigan, Supt. of the Spruce Gulch mine, and his foreman, Mr. David Ewald, arrived on the 8th inst., with a large load of hydraulic pipe from Amador Co. They receive their supply of water from Clark's ditch, and expect to have the mine in full operation in eight or ten days. The gravel prospects well, and without doubt they will have a good paying and extensive mine.

NOTES.—*Cor.*, *Chronicle*: The Machu mine, owned by Messrs. Hunter and Clark, is running, and I learn that they are taking out rich rock. The Wide West is still being worked. The Scorpion mine has shut down, but will resume operations soon. Geo. Eberhardt's mine is running in full blast.

ANGEL'S CAMP.—*Mountain Echo*, Jan. 2: Mining prospects have not been brighter in this section for many years. There are several quartz mills of greater or less degree which are kept steadily running and are paying well.

CAVE CITY.—*Cor.* of *Greenville Bulletin*, Jan. 9: Mining appears to be on the eve of quite a boom here at present; a few old mines are now running, and several new ones will be started later in the season. The Sheep Ranch mine is running 30 stamps on good ore, and the McPherson is running 8. At Angels a 40 stamp mill will be built in a few months. The new mill on the Orofino begins to loom up like a pile-driver in a fog, and under the management of a Plumasite will be ready to run in three weeks, if all goes well. Wages here are about the same as in Plumas, and men quite as plenty. There is an opening here for the investment of capital to very great advantage.

Del Norte.

BIG FLAT MINE.—*Crescent City Record*, Jan. 5: During the last heavy rains a slide occurred at the Big Flat mine, taking away the ditch for some distance, which we learn will cause a delay in the work for several weeks. There was also a slide at the Armand mine, carrying away the flume for some distance, and doing other damage to the works, the extent of which we did not learn.

EI Dorado.

NASHVILLE.—*Republican*, Jan. 10: The Nashville mine under the direction of Mr. Thomas K. Johnson, is at last in good paying condition, they having struck, at 500 level, an 18 foot ledge of good milling ore; the chimney appears to be pitching south, and the drift already in about 80 or 90 ft., shows the ledge still improving in size. The owner of the mine, Mr. Hendy, proposes to sink another hundred ft. immediately, and also talks of putting up 20 more stamps, besides those that are already running steadily. Mr. G. W. Bibbens, a mining expert from the Bay, has been in town several days and proposes to open up various mines, among them Mr. O. P. Hart's mine, situated north of the Nashville mine, and I believe on the same vein. There are parties also talking of taking hold of the Lone Star mine, the property of Mr. J. C. Heald.

MINE BONDED.—The Reid mine near Ringgold, has been bonded to some San Francisco parties, and we understand that operations will soon be commenced on it, under the management of Mr. J. J. McChesney, of San Francisco.

Fresno.

MILL CREEK.—*Cor.* of *Expositor*, Jan. 8: Vincent Moore and Russian Charlie, otherwise Charles Brown, discovered what promises to be a valuable

mine, on Hughes Creek. They are now sinking a shaft. The lode is about 12 inches in width, and shows considerable gold without the aid of glass; there has been very little prospecting done in this district as yet, and as soon as a mine or two can be developed here, we doubtless will have a paying camp. Messrs. Akers, Lewis and others will commence work on their ledges in the course of a few days. We are hoping that before six months have passed, the sound of the stamps will be heard.

Inyo.

THE MINNIETTA.—*Independent*, Jan. 12: Mr. J. J. Gunn has relocated this property, which produced \$321,000 in '77 and '78. It was the property of the Cerro Gordo Freighting Co.; but nothing has been done on it since March 23d, 1882. Mr. Gunn has a force taking out ore from one of the mines, which ore he will have worked by Frank Fitzgerald.

MODOCK.—Superintendent Fitzgerald reports the amount of ore, selected flue dust, and slag on hand as 307 tons. A force of ten men is at work, breaking from seven to nine carloads of high-grade ore daily. The furnaces will not be started until the weather opens. Mr. Fitzgerald intends to make the next the largest run since he took charge of the property.

§ CLOVER PATCH.—A new and extensive strike is reported in the Banner mine, at Clover Patch. Messrs. Nixon & Co. are engaged in putting an additional battery of five stamps in the Wild Rose mill.

A STRIKE.—Morton & Stapp have struck a rich pay-streak in the Red Rock mine, Lookout district. Average of assays of streak was \$207 in gold per ton; choice pieces, \$4,764.80 per ton in gold.

BEVERIDGE.—The Keynot arastras have been yielding splendidly in gold from the ores of the various mines owned by the Mexicans, but it is among the impossibilities to get at the exact amount. Chas. McEvoy has gone over to get his mill ready for work as soon as sufficient ore has been got on the dump for a run.

ABOUT READY.—It is stated that the new Maxim mill at Chrysopolis will be started up during the coming week. The machinery is of New York manufacture, and consists substantially of a cannon-ball quartz crusher. About 100 tons of high-grade free gold ore has been mined and hauled to the mill.

DIANA.—The Diana mill, at Benton, has been running for some time on rock from the old Neal mine, in Indian district, with favorable results.

Monro.

THE RISE IN BODIE.—The *Free Press* of Jan. 10th quotes from the S. F. *Post* as follows: "The insiders of the Bodie Con. Mining Co. now say that a point in the mine, on the 306 level, 25 ft. south and 40 ft. east of the main shaft, a vein from 18 inches to 2 ft. wide of very rich ore, averaging \$200 per ton, has been cut. They report that an upraise has been started in this ore, which was up this morning 35 ft. with rich ore in the top, and say that it belongs to the old Fortuna vein. These alleged developments extend over a period of three weeks. Seeing that the same insiders declared emphatically during this period, that there was nothing new in the mine to warrant an advance in the stock, we hardly know which story to believe."

STANDARD CON.—*Free Press*: During the week there has been extracted and sent to the mills 1423 tons of ore, from which 2680 ounces of crude bullion were received, and \$16,986 shipped to the company. Upraise No. 2 from south drift No. 2, 1000 level, has been advanced 8 ft.; total height 109 ft., showing the vein $4\frac{1}{2}$ ft. wide. North drift No. 1 is being re-timbered. North drift, 700 level, has been advanced 9 ft., and is now in 523 ft. North drift from north upraise is in 208 ft.; progress 8 ft. all in good ore. The stopes are looking well.

BODIE CON.—The work now doing west of the shaft at the 306 level is opening up some fine ore, which gives promises of being in good body. During the week there were 144,765 tons of ore hauled to the mill, and the same amount was crushed. The assay value of the pulp was \$37.10; that of the tailings was \$6.02 per ton.

BULWER CON.—North drift, 700 level, is in 523 ft.; progress 9 ft., with no change to note. West crosscut from south drift, 500 level, is in 486 ft., in very hard rock.

MOUNT GIBBS.—A prospector just from Tioga states that some of the claims at Mount Gibbs are looking remarkably well, and that there is considerable high-grade ore in sight in several of them. The Deer Lodge and Jefferson claims, owned principally by R. A. Sawyer, are good prospects. The latter shows a vein between five and six ft. wide, of very fine ore, assaying well. The former is a ten-foot vein which promises, if present appearances amount to anything, to develop into a fine property. Work on the Great Sierra tunnel is progressing as usual.

Nevada.

YOU BET.—*Transcript*, Jan. 11: The English Co. has been hoisting and crushing gravel regularly from their claims at You Bet, and the plates are said to give assurance that the dirt is paying well. A temporary delay is being experienced by some water breaking into a drift from the canyon Tuesday evening and flooding the underground workings.

DRIFTING THE ONLY THING.—Nat. Bailey of this city has returned from Little York where he has been for some time past engaged in making iron pipe for the hydraulic mining company of which S. Wheeler is Supt. Mr. Bailey says Sawyer's decision fell upon that locality like a thunderbolt. The company had at immense expense, put the mine in first-class shape for a big run, but immediately upon receipt of the decision all work was quit. It is quite likely they will try the experiment of drifting, although there is much doubt if the claim can be made to pay by that process.

Plumas.

ARGENTINE.—*Greenville Bulletin*, Jan. 9: The future of Argentine is quite encouraging. Mr. Haun has lately cut into a fine body of good ore in the Empire mine. Many years ago a tunnel was run, and a ledge struck in what was known as the Conkling mine, but the then owners were too poor to put up the necessary machinery to work the ore and the mine was abandoned. Mr. Haun located his claim on the opposite side of the ridge from the Conkling, thereby securing good water power; he then ran a tunnel and struck what he thinks to be the same ledge found in the Conkling, but at a greater depth. The ore is rich, and the ledge extensive. Mr. Haun has a mill already for work, and intends to begin crushing rock early in the spring.

ELIZABETHTOWN MINE.—Loring and Leavett put a man to work in the Elizabethtown mine cleaning up bedrock that had been worked over by Manson and Corbin. On the first day the man was at work he cleaned up \$90, on the second he got \$70. In one day from new ground \$425 were taken. The mine is doing well.

A GROUP OF MINES.—The Arcadian, Sunset, Antelope, Central, Garfield and New York mines are all near together, and all owned by different parties. The Arcadian and New York have each a mill of ten stamps capacity. All of the claims have been well prospected; from the two last named a good deal of ore has been worked with satisfactory results. If all of these claims were owned by one company, and worked under one management, a large and profitable mining property would be the result. The location is the most favorable in the district, the ledges rising up the mountain side, one above the other, so that ore could easily be run to the large mill that would crush the whole.

San Bernardino.

CALICO.—*Print*, Jan. 12: A similarity exists between this and Leadville, as the mineral there seems to lie in many instances in horizontal veins. Here it is found in both horizontal and vertical veins. One of these vertical veins has now been worked 500 ft. and still shows no sign of failing. This mine alone in a run of ten months has produced over \$400,000 in silver bullion, over half of which has been clear profit. Another mine, whose mineral deposits appear to be horizontal and known to be 300 ft. in width by more than 400 in length, and from which the ore is extracted after the manner of a stone quarry, has yielded over \$150,000, although the depth so far reached does not much exceed 20 ft.; this also is in successful operation. There is at least 300 men, miners and chloriders in the Calico mining district, busily engaged in getting out ore and developing the various properties, and the only mills available are the Oro Grande, which has turned out over \$400,000 of bullion from the King mine within the last ten months, situated 40 miles away; the mill at Hawley's station, 8 miles distant, which has shipped at least \$300,000 of bullion to San Francisco during 1883, and the Oriental mill, six miles from Calico, which has also shipped about \$200,000 in bullion in the same length of time. The accumulation of ore on the dumps is steadily going on, and another mill of 15-stamps would find constant employment, more especially if erected in the immediate vicinity of the mines. The Trojan district, 100 miles east of Calico, contains the well developed Bonanza King mine and its beautiful mill which has turned out in round numbers the modest sum of \$700,000 during the past year.

Sierra.

MARGUERITE.—*Downieville Tribune*, Jan. 10: The outlook for the Marguerite mine was never more promising than at present. With the opening out of a new level (No. 4), a fine ledge has been developed, proving conclusively that the vein is growing stronger as depth is acquired. A couple of new boilers have lately been placed in position, and the pumps were started up with the new power to-day. With the old boiler the work of sinking the shaft was necessarily slow, as it did not furnish sufficient power to keep the shaft clear of water. Above ground everything is being so arranged as to insure the working of the mine on a more economical scale than ever past season. The mill is running steadily on good paying ore. The flume which is to convey water to the turbine wheel, to be used in connection with the wire cable in furnishing motive power for the running of the hoisting and pumping machinery, is completed. The wheel and cable are to be placed in position as soon as they arrive at the mine.

FOREST CITY.—At the Wisconsin mine, work in the upraise has been discontinued for a time, owing to the bad air. This can be obviated as soon as sufficient water comes for a blast. In the meantime the men are busily engaged in repairing the tunnel and getting out timbers.

HOWLAND FLAT.—A subscriber at Howland Flat writes us that that once thriving town is but a sad reminder of its former self. The effect of the Chinese incubus is more noticeable every year. The Virginia Co. are still engaged in pushing ahead their main tunnel. Messrs. Strubel & Bettinger took a twelve ounce gold nugget out of the Blue Bank claim, at Poker Flat recently. It was sold to Dixon Brabban, of La Porte.

NEVADA.

Washoe District.

UNION CON.—*Enterprise*, Jan. 12: The main south drift on the 3,100 level is being pushed ahead as rapidly as possible. It is in dry ground. Recently its course has been changed more to the west, and it is now going directly toward the head of the drift which is coming up northward.

SIERRA NEVADA.—About 15 feet will be made this week in the upraise from the main north drift on the 2,900 level. The ground continues dry and favorable. On the 3,100 level a drill-hole was run 125 feet in a northerly direction, at which distance quartz was reached and a small flow of water was tapped. Work has been resumed in the northeast drift.

ALTA.—The work of cleaning out the main east drift on the 2,150 level is about completed, and they will now soon resume work in the face of the drift out into the ore body cut by the diamond drill previous to the flooding of the mine. The pumps are all working well and the water gives no trouble.

MEXICAN.—On the 3,100 level have completed timbering up, cutting a drain and putting in drain boxes. As soon as the connection is made in the Union Con. and an air gallery formed, prospecting operations will be resumed and may be economically prosecuted.

YELLOW JACKET.—The amount of ore extracted is limited only by the quantity that can be reduced by the mills on the Carson river. Since the late storm there has been some increase in the volume of water, but there is not yet sufficient to allow of the mills being run to their full capacity.

OPHIR.—Some streaks and stringers of favorable material are being cut in the drifts which are being driven north and south on the 150 level. On this level they are still extracting a considerable amount of ore that will pay for milling. The winze from this level down to those below is being sunk as rapidly as possible.

CROWN POINT.—As much ore is being taken out

from the old upper levels as can be handled at the mills on the river, and considerable work is being done in the way of exploring for new deposits.

GOULD AND CURRY.—The bottom of the joint Best and Belcher winze below the 2,500 level continues in material of a promising appearance. The amount of water at the bottom is not great.

COMBINATION SHAFT.—The new hydraulic pump is working splendidly, and to the entire satisfaction of all concerned. The shaft will now be sunk to the 2,800 level as rapidly as possible, at which point a station will be opened and a drift started west.

CON. VIRGINIA.—On the 2,700 level joint California winze No. 2 is going down at the rate of 12 to 15 feet per week in ground that works fairly well.

UTAH.—The northeast drift on the 1,750 level is being advanced quite rapidly in ground that works well and is of a promising appearance. This drift is passing through ground hitherto wholly unexplored.

HALE AND NORCROSS.—Excellent progress is being made in sinking the winze below the 2,700 level. No water to give any trouble is encountered. The winze will be put down to the 2,800 level as rapidly as possible.

BEST AND BELCHER.—The material encountered in the joint Gould and Curry winze below the 2,500 level, is still promising. Some water is coming in at the bottom, but it is handled without much trouble.

IMPERIAL.—The main west drift is now within a short distance of the old upper levels, which it is intended to explore and overhaul for ore.

SCORPION.—The usual progress is being made in the main west drift on the 500 level.

CALIFORNIA.—Joint Con. Virginia winze No. 2 is making good progress below the 2,700 level, in fair working ground.

ANDES.—Some low grade ore is being extracted, and prospecting continues at several points.

OVERMAN.—A small amount of ore is being taken out of the old upper levels.

UNION SHAFT.—Are still easing timbers and doing repair work at the 2,300 station.

BELCHER.—Some ore is still being extracted from the old upper levels.

Argentine District.

HARRIS MINE.—*Bodie Free Press*, of Jan. 13, gives the following from the *Virginia Chronicle*: The Argentine district, in which the Harris mine is located, was abandoned in early days on account of the "salting" of the North Ophir mine. The managers reported striking pure silver, and on the strength of the supposed discovery, the stock rose from a mere nominal sum to quite a large amount. Among the chunks of silver taken from the mine was a small piece on which was discovered an eagle and a Goddess of Liberty. This was carrying the thing too far, and the bottom dropped out of the mine and the district. Previous to this collapse there had been discovered some small gold ledges in different mines. Among the number was the Buckeye, which is but a few hundred yards from the new discovery, and produced at that time considerable ore of a high grade. There are now at least half-a-dozen different parties prospecting.

Belmont District.

BELMONT MINE.—*Courier*, Jan. 5: The following is a copy of Supr's. letter of Jan. 5: The ledge in north stope on 200 level has taken its proper position, showing $\frac{1}{4}$ ft. thick. All other stopes looking well and yielding good ore. Hoisting works running well. Mill will close down next week.

Candelaria District.

COLUMBUS CON.—*True Fissure*, Jan. 12: Since last report the usual amount of work has been done in all of the levels of the mine. The shaft has attained the depth of 40 ft. below the station on the third level. The drift from the third level station has been extended five ft., making a length of 25 ft. The ground in this drift has been and now is very hard, hence the slow progress. The drift from the bottom of the bonanza winze, running to connect with the third level station, has been extended ten ft., making a total length of about 80 ft. The drift has been running through ground favorable for working, and is in vein matter that shows streaks and bunches of very good ore.

THE DORAN MINE.—At the eastern end of Columbus Mining district is located the old Nevada mine. In former years it was worked with good returns; failing to yield sufficiently well in consideration of the then high prices of wages and supplies it was abandoned by its owners. A few years later it was relocated by R. E. Doran, of Columbus, and near whose home it is situated. Something over a year ago he incorporated it under the name of L. O. Yolo, and with the assistance of New York capital has done a great deal of work, which will soon return in the shape of dividends. Last fall Mr. Doran received from New York a Howland pulverizer. It is claimed for it that, with 20 horse power, 40 tons per day can be worked. Everything is being done in the best of workmanship; if the process is successful, of which there is no doubt, a great impetus will be giving to the mining interest of this county.

Eureka District.

THE RICHMOND.—*Sentinel*, Jan. 11: George Hopkins, Chairman of the Richmond Con. Mining Co., at their half-yearly meeting, held in London on the 19th ult., said: You will have noticed from the returns that the general furnace has been running continuously throughout the six months without any hindrance. The result of the half-year's work is a yield of 7,726 ounces of gold, 220,053 ounces of silver and 1,704 tons of lead. This yield is from two furnaces, one smelting 300 tons weekly, and the other a little under that amount, working with the refinery and smelting up the drosses from it mixed with low grade Richmond ore and some purchased ore. As regards the profits of the half year, a rough balance sheet made up to the end of the six months, and taking lead at its present very low price, shows the profit is about \$65,000. At the last half-yearly meeting, on the question of dividend I undertook to say that the Directors would, if they could see their way so to do, declare a dividend. I am happy to be able to tell the shareholders that when the board came to look into the question they were able to pay the last dividend of 5s. from the earnings of the company without in any way trespassing upon the reserve fund.

DIAMOND CITY.—*Sentinel* of Jan. 9: F. J. Mette returned yesterday from a visit to Diamond City,

and gives a flattering account of the Enterprise property. He says that the mine is looking better than ever, and that with the ore in sight he calculates that the furnace can be kept running at full blast for six months, with fair indications of plenty of ore afterwards, and an indefinite prospect for developments. There are now 65 men employed altogether in the mine and on the works. The furnace is working to a charm. Since it started up, Dec. 13th, it has stopped only once, and then but for two hours to tighten some belting. The ore carries its own flux in abundance. From 35 to 40 tons per day are reduced. The average of the bullion, Mr. Mette states, is over \$150 per ton.

NOTES.—John Steele is getting out rich ore from the Diagonal mine on Silverado mountain. John Potter has put up a whip on the Mildred shaft at Secret canyon, and is driving for ore from the 100 level. P. N. Hansen has had the assessment work done on the Secret Canyon Tunnel mines for 1883, and work on the property will be resumed when spring opens. Work by lessees has been commenced on the old surface workings of the Connolly mine, and the prospects are that it will prove to be a profitable venture. Messrs. Moran and McConnell shipped five tons of ore on Friday last to the Richmond works from the El Dorado mine, situated on the west side of Prospect mountain. The Mabel mine, Secret canyon, has been leased for one year to Messrs. McDonald and Humer. There is some ore in sight and the prospect for more is very good. Messrs. Graham, McKee & Co. are drifting towards the big break in the Page & Corwin mine in Secret canyon, occasionally meeting with small bunches of ore and encouraging prospects for rich developments. In addition to the high grade ores of Eureka and adjoining districts, the tons of low grade ore already exposed can be counted by millions, and the question is being asked daily by hundreds of worthy prospectors, "What shall we do with it?" Grif Thomas and Wm. Parry have relocated the Corliss mine, adjoining the Oregonian. It is a good property, and sufficient ore has been extracted from it to pay all the expenses of working until lately, and the prospect for making it pay again is good. The Whalen mine and other locations connected with it in Antelope district have been relocated by John McCuish and others, and it is understood that Eastern parties will become interested and develop the properties. Messrs. McNaughton and Laird are extracting about four tons of ore daily from a 12-foot breast in the Colorado mine on Prospect mountain, which they have leased. There are now 50 tons of ore being sampled at the Eureka Con. furnaces, which assays from \$120 to \$180 per ton. John McCuish has relocated the Persia, Jenny, Aldine, Roma and other mines in the Antelope district, in the interest of P. N. Hansen, himself and others. There is a good shaft on the Roma, and he is running a tunnel into the hill to connect with it. The Geddes Co. are pushing prospect work in the Geddes & Bertrand mines with Burleigh drills. It is probable, if new ore bodies are discovered, that they will prove more profitable than those already developed, as the rich ore from the latter had already been gouged out by tributaries. The sampling of nearly 25 tons, net, ore from the Silver Connor mine on Prospect mountain has just been completed at the Eureka Con. reduction works, the yield per ton from which is \$67.89 in gold and \$19.65 in silver. The Silver Connor is now as much affected by the discount on silver as other mines, for the reason that of all the ore extracted the yield is three-fourths gold. There are whole mountains of ore in Eureka district that are not profitable to reduce by the smelting, but which would yield handsome fortunes if treated by milling process. Milling business alone, independent of mine owning, would prove an immensely profitable enterprise. Grif Thomas is energetically developing the Oregonian mine on Prospect Mountain. He has completed a tunnel to a distance of 125 ft, and made connection with an incline shaft down from the surface 60 ft. He is sinking an incline winze on ore and ore indications. The winze is now down 30 ft from the tunnel level, two small veins being in sight for the entire distance. The upper one runs in value at the rate of \$500, and the lower one \$300 per ton, both of them coming nearer to each other as depth is attained, and will probably prove to have come from the same source.

Ploche District.

MENDHA.—*Record*, Jan. 5:—This mine at Highland, the property of the Day Co., is gradually growing better, and it appears nearly certain that the ore lately opened up at the 90-ft station is an extensive body. This ore has turned and passed the shaft and is now going east. The vein is nine ft in width, and the ore is of the same uniform grade and quality, and the teams keep steadily hauling ore from the mine to the furnace. The late ore struck on the other side of the shaft, some forty ft below this body, has been run upon a few feet. The ledge is now two feet in width, but we did not learn what percentage it went in silver. Work at the bottom of the shaft is being pushed ahead.

Paradise District.

WILD GOOSE.—*Silver State*, Jan. 8:—Yesterday four bars of fine bullion of the actual value of \$9,321.25, were received at the express office here from the Paradise Valley mill. This is the result of a week's run of a ten stamp mill on ores from the Wild Goose and Paradise Valley mines. This is an auspicious beginning for the new year, and indicates what Superintendent McCurdy intends doing in 1884. It is the largest bullion shipment ever made in the same length of time from the Paradise mill, and as there is plenty of ore, and the mines are being worked on legitimate principles and not for speculative purposes, their bullion product from ores reduced with ten stamps will doubtless average \$25,000 per month, and net the owners a handsome profit.

Tuscarora District.

ARGENTA.—*Times Review*, Jan. 10:—South crosscut is in 44 feet, progress for the week, 6 feet. Rock is very hard again.

NORTH BELLE ISLE.—East crosscut 300 level, total distance 64 ft through very hard formation showing signs of rich ore.

BELLE ISLE.—The north drift, 450 level has been advanced 16 ft during the past week.

INDEPENDENCE.—The usual progress has been made in the drifts and crosscuts. The past week shows no change to mention.

CENTRAL CON.—Shaft 150 ft, sump 10 ft, station

cut out and timbered north drift 8 ft. Rock hard and full of iron—good working ground.

GRAND PRIZE.—South drift on the 500 level has been extended 24 ft during the week. Stopes producing some good ore. Shipped \$5,000 for the week.

ELKO CON.—The main west crosscut on the 200 level has attained a length of 85 ft, no change in the formation. The main east crosscut, same level, has been advanced 7 ft. Thus far the formation is favorable.

NAVAJO.—The east crosscut on 950 level has been advanced 10 ft during the past week. West crosscut, same level, advanced 8 ft. South drift 450 level advanced 13 ft. North drift 350 level advanced 21 ft. The stopes are yielding the usual amount and grade of ore.

ARIZONA.

GROOM CREEK.—*Prescott Miner*, Jan. 4: Billy Davis, of Groom Creek, informs us that 60 ft of his 75 ft contract has been sunk on the "110" mine. At 75 ft drifting will be commenced and hoisting works erected. At the present depth the vein is 5½ ft wide, and assays \$201 to the ton. Recent developments on the Chicago have disclosed very rich ore bodies, and during last month over \$10,000 worth of mineral, most of which shows native silver and fine gold, was taken from the mine.

PINE SPRING.—*Prescott Courier*, Jan. 4: The shaft in Gavin & Co.'s Pine Spring mine is down 125 ft. There are 2 tunnels, one 42 and the other 30 ft. Water, in small quantities, is coming in. There is a great deal of very rich ore in sight in shaft and tunnels. The hill in which this famous mine exists appears to be a common centre for siliceous units. The Co. will soon commence shipping ore.

CHRISTMAS GIFT.—*Globe Chronicle*, Jan. 5: The *Enterprise* says: We reported in the last issue that the Christmas Gift mine was likely to be sold this week. It is now an accomplished fact, Messrs. Eels & Chamberlain, of Cleveland, Ohio, being the purchasers at \$90,000 cash. The Christmas Gift vein is five ft wide, two ft of which gave an average of \$40 gold, and three ft an average of \$476 gold per ton. If there is a gold mine in the territory that can equal this we have not heard of it. It is said that there is one ft of the vein that will average \$1,000 per ton.

NOTES.—Mohave county *Miner*, Jan. 6: Arthur Macy, a graduate of Columbia School of Mines, New York, has been appointed Supt. of the Silver King mine, Pinal county. We are pleased to record the fact that a good streak of ore has been struck in the face of the 100 level of the Cupel mine. The ore streak is from four to eight inches in width and will assay in the neighborhood of \$400. There are five men working on the Lone Star mine. The Schuyllkill mine at Chloride is looking well. Three ft of solid galena in the face of the drift. Ore is being taken from this mine at the rate of a ton and a half a day 40 the man. The ore will average 25 or 30 ounces in silver and over 50 per cent lead.

THE QUIJOTOS.—*Logan Cor.* of *Prescott Miner* Jan. 4: The mines are 80 miles southwest of Tucson and about the same distance south of Maricopa and Casa Grande. Each of the three places are ambitious to become the shipping point for the camp, Tucson so far having the lead. Two town sites have so far been located—Logan and New Virginia—and numerous town lots have been sold in each. At present there is no work being done on the mines, and the deepest thus far reached in 300 ft on one location, with plenty of rich ore in sight to make further prospecting interesting. When work is resumed on the mines, which will be done as soon as the owners have completed surveying their claims and settled with adverse claimants—of whom there are already several—employment will be given to about 30 or 40 men, and there are now in the camp four or five times that number of practical miners; so those who contemplate coming here will do well to wait until a few months' developments make the employment of a larger force possible. Besides the Peerless, Pearl and other mines bought by Nevada parties, there is a wide field of comparatively unencroached on ground in the district to tempt prospectors; and already several new claims of fair promise have been located, the quartz generally containing free gold and going well in silver.

A TUNNEL THROUGH THE MOUNTAIN.—The *Florence Enterprise* says: F. A. Adams returned from the Quijotos this week. He says Charlie Beckwith has laid out a new town site on the west side of the mountain, and parties are coming in and taking up the lots at a lively rate. Sufficient water for camp purposes can be obtained on that side of the mountain, at a depth of 35 ft below the surface, and it is probable that the new town now starting will give Logan City a lively race in the matter of growth and business. Hank Smith, the Bonanza firm Supt., has arrived on the ground, and is preparing to drive a tunnel through the mountain, 800 ft below the highest point on the Peerless claims. It will not require a tunnel over 500 ft long to pass entirely through the mountain at the base, and as the work will be pushed with all possible speed, we shall soon know the probable future of this property. If the tunnel should open up an ore body \$10,000,000 would not buy the claims.

ANOTHER DISCOVERY.—The *Tucson Star* says: Miners just from the Quijotos report that another big strike has been made about 30 miles southeast of the great bonanza camp, and those who have seen the ore and talked with the men who made the discovery do not hesitate to say that it is the most extensive discovery that has ever been made in this country.

COUNTER CLAIMS.—The *Pinal Drill*, of 5th, says: The Quijotos fever is evidently abating. Hundreds have arrived at the foot of the mountains and found feed scarce, and water two bits a gallon. There have been several locations made upon the ledge on ground claimed by the Bonanza Kings. Some of these are said to cover the ground from which the rich ore was taken that has been shipped. The Co. hold the ground with men hired at \$200 per day. The exiled locators have retreated to Tucson. They ask prices high up for their various small parts of the ledge, \$100,000; \$150,000 and so on. It is likely to take a long time before this war is settled.

COLORADO.

IDAHO SPRINGS.—*Gazette*, Jan. 5: The Mott Sampling Works is a great boon to this camp. A

miner can obtain his cash for as small a quantity of ore as 25 pounds. A *Gazette* reporter was informed by manager Mott that the small lots which have been purchased by the works for 1883 aggregate thousands of dollars.

Twelve hundred tons of ore treated at the Mott Public Sampling Works netted the owners \$75,000, showing the average value of the ore produced in this vicinity to be \$62.50 per ton. Taking into consideration the charge for crushing and the excessive rates of the railroads, the price of smelting, etc., it shows this to be anything but a low grade camp.

BULLION CAMP.—At a depth of 35 ft in the shaft of the Little Ute lode, in Bullion camp, 16 inches of a pay streak has been exposed. A sample assay from the whole streak ran 315 ounces in silver. The quartz carries large quantities of gray copper. This property is now owned by Messrs. Elliott, Baron and Maroney.

IDAHO.

BANNER.—*Statesman*, Jan. 5: Mr. Albert N. Hull informs us that he received a letter a few days ago from James Monroe, who is now in New York, stating that the Elmira Co. had sold the Banner mine to a New York Co. for \$300,000, and the money was all paid down. The property sold embraces the mill and all the mines, some 15 in number, including the famous Banner mine, in the Banner district, 28 miles northeast of Idaho City, in Boise county. The Elmira Co. took out last summer \$109,000 in a 100 days run of the mill. Messrs. Hull & Monroe own an extension adjoining the Banner mine which prospects as well as the Banner and which he has an offer for and will probably sell before he returns from New York.

GAMBRINUS.—*World*, Jan. 1: Joe Voshay arrived here Friday evening from New York, where he went some time ago to endeavor to get a company to take hold of the Gambrinus mine, near this place, and was successful, we are informed. He also induced an eastern company to send out representatives to look at the Bruneau country with a view of digging a big irrigating canal. Joe left Saturday morning for Bruneau.

GREENHORN GULCH.—*Wood River Times*, Jan. 2: There is about two ft of snow on a level in the gulch. The road was broken to the Imperial group of mines yesterday. A teamster went up with 1,500 pounds of supplies. He would unhitch his horses, drive them ahead a piece, then come back for the sleigh. This would be repeated until he got to the mines. It is about ten miles to the mines, and a part of the way the snow was two and a half ft deep.

Contract work is being done on the Veta Grande group.

PARKER MINE.—A short time ago four men were put to work sinking an incline on the ledge, and on Christmas Eve, at a depth of about 100 ft, they cut into a body of solid ore which proved to be over five ft wide. The drift has since been continued, until the sides and face of it are all in solid ore. This ore is a solid mixture of chlorides, carbonate, azurite of copper, and galena, and assays as high as 2,870 ounces per ton. This is from selected samples, and is no reliable indication of the value of the ore per ton. An average sample, however, taken from a stratum which constitutes fully one-third of the width of the ore-body, went 666 ounces silver and 62½ per cent lead per ton. An average sample of the iron ore or gangue of the vein (which has heretofore been thrown off the dump as worthless) was found to carry 478 ounces per ton.

ATLANTA.—*Ketchum Keystone*, Jan. 2: Twenty-two men are at work in the Monarch mine, and the mine is looking well. Twelve men are working in the Buffalo, six are employees of the company, and six working in the shaft by contract. Machinery and timbers are on the ground for new hoisting works, which they will commence to erect about March 1st. At the same time a large force of men will be put in the mine. The Leonore mill was completed in the fall and made a 20 days run on Leonore ore. The mill worked like clock work, and gave entire satisfaction to the company. Owing to some dissatisfaction among members of the company it was closed down, but matters will permit of the resumption of work which will take place in about two weeks and continue through the winter. Owing to delays in the transportation of machinery the Tahoma mill is not completed, but will be as early in the spring as the weather will permit. The Atlanta mine, owned by Julian Hill and others, is being worked by a force of three men, who are extracting high grade ore, and the mine is looking better than ever before.

ERVINE MINE.—John H. Harris is running two tunnels to tap the Ervine mine, on Boyle Mountain, at the depth of 360 and 485 ft. He informs us that several large bodies of 220 ounce ore have been struck, and that the mine is looking better than ever before.

MONTANA.

ANOTHER EXCITEMENT.—Fort Benton Cor. *Butte Miner*, Jan. 5: Just now the absorbing topic here is the contemplated invasion of the Blackfoot Reservation by organized parties who know the value of the magnificent country occupied at present by the redskins. So intense is the excitement that scarcely any other subject is talked about. The papers are full of it, and the *River Press* announces its intention of publishing a "boom edition" devoted entirely to the Reservation subject. The richness of the Bear Paw country in placers and gold and silver ledges has been known for many years, but prospectors and miners have been kept out by the proscriptions which environ the National Indian reservation. In 1864 a party organized by a man named Keyes at Fort Benton had scarcely entered the reservation when they were attacked by the bloodthirsty Blackfeet, and the entire party massacred. This sequel proved a dampener on the ardor of adventurous prospectors, and of all the companies organized to enter the new gold fields not a single party made a start. The secret of Keyes' rich diggings died with him. In 1868 a small party went into the Bear Paw country and located some valuable placer diggings and quartz locations, but they were driven off. The locators of claims at that time are only waiting for the reservation to be thrown open to settlement to relocate their claims and commence active operations upon them. The matter of opening the reservation to settlement will come before the present session of Congress.

COUR D'ALENE.—*Butte Miner* Jan. 2: A man well known in Butte as an old miner and prospector was interviewed by the *Miner's* reporter on Friday. He said that with two other men he left Butte the latter part of October, as the representatives of a pool, composed of a dozen Summit Valley miners, who furnished them with expense money. They had undertaken to cross the range from Heron Siding. There being no trail, they lost their bearings and wandered about the mountains for several days. When at a point about 30 miles northeast from Eagle City they found promising gold croppings. They went into camp for ten days, during which they prospected the ledge, by several open cuts and a shaft ten feet deep, developing a vein from two to four feet wide which was traced by the croppings a distance of about three miles. He had assays of the quartz showing from \$25 to \$482 to the ton, and showed a beautiful specimen of white quartz which was ribbed and streaked with free gold, and would assay way up into the thousands. After staking off claims for their party and posting notices on the ledge, they descended into a narrow gulch, through which ran a good sized creek. Following down the stream they came to a valley stretching out northeast and southwest a distance of 14 or 15 miles, and from a quarter to a half-mile wide. They went into camp that night at the head of the valley, and were overtaken by a snowstorm. During the day they were snow bound, and one of the party amused himself by panning out a few shovelfuls of dirt from the creek, by which they had built their fire, and was astonished to get about 20 cents to the pan in coarse dust. They remained in the valley about a week, and prospected in eighteen or twenty places, from which they scraped the snow. They found gold wherever they prospected, and our prospector yesterday exhibited four and a half ounces of coarse gold, and bits of float quartz carrying free gold, as a result of their labor in the valley.

OREGON.

NOTES.—*Jacksonville Times*, Jan. 4: The Sterling Co. has not commenced piping as yet, but does not need much more water to set both pipes in motion, as the ditch is half full now. Several of the miners are making good use of their reservoirs. The ground is well soaked and not a great deal more rain is needed to set all claims in motion. Sargent Bros., of Steamboat, have enough water to groundsluice with. Cadwell & Sons have started up their giant, J. D. Shener & Co. are expecting to receive a quantity of hydraulic pipe soon. Jack Layton is making the gravel fly at his extension mines on Farris' gulch. A. Stevens and J. M. Kendrick are about commencing to mine on Jackson creek.

NEW MEXICO.

GOLDEN RULE.—*Silver City Enterprise*, Jan. 4: The Golden Rule mine and mill started up last week with nearly as large a force of men as were employed when work shut down. The men were paid off in full, and those that chose were allowed to continue, while others, who during the temporary embarrassment of the company made themselves obnoxious, were requested to seek other employment. The return from the last shipment of bullion, previous to the closing, was sufficient to pay off all indebtedness of the mine and mill and leave a surplus in the hands of the manager. From E. Fender, who on Tuesday returned from the Golden Rule, we learn that the mine is improving with every ft of work done, and at the depth of 208 ft a five ft vein of the usual grade ore is being worked upon. He states that the mine will much more than pay expenses besides the cost of development.

STEEPLE ROCK.—*Cor.* of *Silver City Enterprise*: Everything at the Carlisle is just beginning to boom. A town site has been located and the sale of lots commenced. On the first of the year all Chinamen must go, their places to be filled by white men. A much larger force than ever will also be worked, there being now an abundance of ore and water. Work is going on at the Nugget with the usual success. It is thought the owners will soon commence shipping ore, as they will, with their present force of men and with what ore they are ahead, be able to continue shipments, if once commenced. The mine known as the Diamond, which is the west extension of the Nugget, owned by J. Currie, of Steeple Rock, and Ross & Smith of Lordsburg, and on which 275 ft of work has been done with flattering results, will be worked to a still greater extent soon. Work on the Eagle has been suspended for an indefinite period.

THE GOLD FIND AT SAN CARLOS CAMP.—*Las Vegas Gazette*, Jan. 2: There were scores of prospectors out in the hills yesterday, in the neighborhood of the old San Carlos camp. As yet no more nuggets have been found like that picked up at the Hallie claim, although considerable dirt has been washed which produced quantities of the yellow stuff. Any number of good looking rocks, carrying gold that could be seen with the naked eye, were brought in. Most of the specimens showed silver indications, such as argentiferous galena, together with strong traces of copper. A new excitement was raised yesterday by an extraordinary discovery on Tilden street, east side. While digging a well at Chris Weigand's pop factory the glittering stuff was found and fifty colors came from a single pan. A well on Charlie Wright's property, near by, showed a like result, and a stake bearing a location notice signed by C. L. French, is planted on the site. The finds were kept quiet, but got out, and everybody became interested at once.

NOTES.—*Las Cruces Republican*, Jan. 5: Assessment work is being done by William King on the Davis group, in the Organs. King has just finished work on four claims in the Jarillas, belonging to the same men (Oliver Davis & Co.). The Dixie has shown up splendidly. Perkins and Bickford have finished their contract on a claim in the Jarillas belonging to Hoopes, Hampton and Dr. Rogers. It showed over three ft of good copper ore. The assessment worked on the Hawkeye has shown up a good body of ore, some of it very rich, and similar to that of the Little Buck. The pumping of the water out of the Memphis has lowered the water 18 inches in the Rio Grande mine, nearly a mile away, showing there is a subterranean connection between the two. Both mines are situated at an elevation of 1,700 ft above the plateau of the Rio Grande.

The Growth of Small Industries in the Foothills, Mines and Mountains.

What is to be done with the on-coming generation in California is a question that is exciting much interest and eliciting some discussion among those who assume to deal with these ethical and economic subjects, and the thoughtful generally. Here, as everywhere else, the question resolves itself into one of employment, mainly what is there for the youth to do that they can do or can be induced to. The young people of California are not worse, perhaps, than those of most other countries. The average youth are inherently about the same the world over. Nevertheless, the question with us becomes a little more difficult of solution, by reason of certain industrial conditions and social peculiarities that here obtain.

In the first place, our juvenile population, already large, is increasing rapidly, California being a prolific country. Though not particularly vigorous, they are apt to be tenacious of life, a large percentage of those born surviving the perils of adolescence and reaching the adult state. They are a little precocious, growing fast and maturing early. As a general thing they have come to stay, being like the rest of us, attached to California and not likely to seek residence elsewhere. They would not be apt to thrive if they did so. Like some other products of California, the native horn do not well bear transplanting. The *Sequoia* it is said will not grow elsewhere. Other countries, if they become overpopulated or accumulate too many of an undesirable class, find relief through emigration. But through no such means can we ever find relief from any obnoxious or too numerous class, should there be need for it. But this aspect of the case is not serious; there is here room for all and means enough for insuring all a comfortable subsistence, were such means turned to good account.

In older communities it is the youth of the larger cities who most stand in need of work. With us it is the youth of the rural districts, or at least certain portions of them, who so want work supplied to them. In most other countries there exists in the cities a large surplus of the young, for whom it is difficult to find suitable employment, though outside of these large towns there is apt to be enough for all. Here these conditions are measurably reversed, the larger cities being the principal centers of our mechanical and manufacturing industries, thereby affording much suitable employment for the young. The great agricultural valleys of California are also capable of supplying work for all classes, old and young.

But there remain the mountainous districts of the State, with their valleys and out-lying foothills containing resources of a varied kind, but no one of which is capable of sustaining a large population. Possessing a tolerably good soil, and being for the most part well wooded and watered, these districts are admirably adapted for fruit raising and the culture of the vine, there being also much land on which, with careful tillage, fair crops of the cereals can be produced. This is the region of the gold mines and other mineral deposits of value. Taken as a whole this is not a bad country for stock, there being much good summer pasturage—also mast for swine. While the mining districts were never much more populous than they are to-day, the majority of the inhabitants formerly consisted of grown men, mostly engaged in mining; whereas, much the larger number is now composed of women, children and adult youth, while of the men, not more than three-fourths follow the business of mining, a great many having turned their attention to cultivating the land, raising stock, making lumber, and to various other pursuits.

Having originally gone to the mountains for the purpose of mining, the most of these men stuck to that business as long as it would pay; nor did they in all cases wholly abandon it after devoting a portion of their time to other pursuits; so that we have now the spectacle of farming, mining and stock raising, being in many instances carried on here by the same individual, and this quite successfully, there being seasons of the year when he can give his entire attention to some one of these branches without detriment to either of the others. Thus, in the northwestern counties, where objections have been made to hydraulic mining, this branch of business can be engaged in along through the winter and early spring, when it can be prosecuted to the best advantage, and during which the farmer-miner has not much else to do. Later in the year, when the grain harvest being over, there comes another season of leisure, then, and not before, the river beds can be worked to advantage. As operations in the quartz and drift mines can be carried on equally well at all times, parties in working these can consult their own convenience. Between the closing of river-bed mining and the advent of winter comes another interval of rest, which is to be availed of for gathering in the beef cattle, now in good condition, and driving them over the mountains or off into the lower country to market; and so the inhabitants of these foothills and mountain regions are coming to find their time fully and profitably employed, the combining of so many minor industries enabling them to make a good livelihood in sections of the State where only a few years ago their ability to do so was far from being assured. In a short time there will be added to

the occupations now pursued others for which these sections of the State are well suited, such as fruit drying, curing raisins, making wine, sericulture, etc.

Throughout nearly all parts of the mining regions the condition of the inhabitants shows improvement through the multiplicity and growth of these small industries, the change in some of the more northerly-lying counties being especially noticeable. From Trinity, for example, which not long since was importing its beef, one stock-raiser has already, this season, driven over the mountains into the upper Sacramento valley five hundred head of fat cattle, which were there disposed of for a good price. Limiting observation to one branch of business or a single neighborhood the changes effected seem small, but extended over the whole field they are seen to aggregate a great deal.

It is to be set down to the credit of the young people of the interior that they do not evince such a desire to leave their homes and seek employment in the cities as is common with this class elsewhere. This argues well for their future. Notwithstanding the gloomy forebodings of the past the present industrial outlook presents many features of encouragement, this here noticed being one of the most hopeful.

Watching the unfolding of coming events we shall hope for the evolution of such industrial system as will meet our many-sided wants, and thus work further surcease of our fears for the future of this, our California.

How the Debris Decision is Received.

Dispatches from various localities in this State show how the news of the debris decision is received, as follows:

DOWNIEVILLE, Jan. 8.—A feeling of general indignation prevails all classes in regard to the debris decision as unjust and oppressive, and a deadly blow at the mining industry of the country.

GOLD RUN, Jan. 8.—Miners and citizens feel that Judge Sawyer's decision is unjust, and everybody is indignant. All property is ruined and all feel that the general government should settle the trouble.

CAMPTONVILLE, Jan. 8.—Judge Sawyer's decision had to some extent been anticipated by the miners, yet it has a very depressing effect on all kinds of business here.

NORTH SAN JUAN, Jan. 8.—The decision of Judge Sawyer in the debris case was received here on yesterday afternoon. It created but little, if any, despondency among the miners and business men, as they think matters will eventually come out all right, and that the interests of the miners and farmers alike will, in the near future, be protected.

AUBURN, Jan. 8.—As a matter of course the decision of Judges Sawyer and Deady is not very acceptable to residents of Placer—Gold Run, Dutch Flat and vicinity being more seriously affected than any other portions of the county. On the Forest Hill Divide but a small amount of hydraulic mining is done compared with the other kinds of mining. No general demonstration was made here. Evidently we must grin and bear it, although it will add to the financial depression hereabouts.

RED BLUFF, Jan. 8.—The decision of a perpetual injunction in the debris case does not create as much comment or feeling here as in counties south of us, as we are exempt from hydraulic troubles. But those who are aware of the decision express a degree of satisfaction which proves that our community is in favor of the farmers winning. Many believe it will help the county by resurrecting the steamboat traffic, which is now prevented on account of the obstructions in the river.

JACKSON, Jan. 8.—The perpetual injunction in the debris case does not materially affect the mining interests of this county, as there are no hydraulic mines of sufficient magnitude to cause injury by their tailings.

CHICO, Jan. 8.—The decision of Judge Sawyer is received with satisfaction by the people in this section. The farmers here, although not sufferers from mining debris themselves, have a strong sympathy with those who are—especially our near neighbors in Marysville.

COLUMBIA, Jan. 8.—The general expressed opinion of representative men of this place relative to the decision in the debris case is that it is unjust.

SONORA, Jan. 8.—The feeling prevails here that the decision in the debris case will work an injustice to the miners and mining interests of the State. The miners having purchased their claims in good faith, the general government should provide some means by which they can work their claims, they having equal rights with the farmers.

STOCKTON, Jan. 8.—Public sentiment in this section is almost unanimous in approval of Judge Sawyer's decision in the celebrated debris case. The decision was not generally known yesterday, and not until to-day was the matter discussed to any great extent. Some think that the decision hardly goes far enough, and that an opening is left for mischief to be perpetrated by exempting from injunction those miners who can confine and take care of their debris. The decision has caused no excitement whatever in this community, but has been received with quiet yet cordial approval.

COLUSA, Jan. 8.—The decision of Judge Sawyer in the debris case was received here with the greatest satisfaction. One hundred guns are being fired.

YONE, Jan. 8.—The first news of the decision of Judge Sawyer in the debris question was received here this afternoon. While this community is not directly affected by the decision, yet it will be eventually. The farmers approve of it emphatically, while the miners and those who sympathize with them are equally emphatic in their disapproval.

The Geddes Company are pushing prospect work in the Geddes and Bertrand mines with Burleigh drills. It is more than probable, if new ore bodies are discovered, that they will prove more profitable to the company than those already developed, as the rich ore from the latter had already been goned out by tributaries before the present company came into possession of the mines.

Academy of Sciences.

The annual election of officers of the California Academy of Sciences was held on Monday, with the following result: President, George Davidson; First Vice-President, H. W. Harkness; Second Vice-President, H. Hermann Behr; Corresponding Secretary, Samuel B. Christy; Recording Secretary, Charles G. Yale (of the MINING AND SCIENTIFIC PRESS); Treasurer, Etisha Brooks; Librarian, Carlos Troyer; Director of Museum, W. G. W. Harford; Trustees—Charles F. Crocker, Robert W. Simpson, George E. Gray, Thomas P. Madden, Ralph C. Harrison, Jas. M. McDonald, Lewis Gerstle.

The report of George E. Gray, President of the Board of Trustees, was read, showing that the money donated to the association by Charles Crocker was being used for the purposes for which it was given. Several thousand persons visited the Stanford-Crocker collection during the year at the Mercantile Library Hall. The expense of maintaining the collection was \$2,066.15. From rents, \$3,908 had been received and \$1,936.50 from members' dues. There was a balance on hand of \$1,631.72 and \$909 outstanding on the books.

The report of Charles G. Yale, the Secretary, showed that thirty-one members had been elected during the year, and that nine had been dropped from the roll. There were now 184 actual members and 132 life members belonging to the association.

The report of the Treasurer showed that \$9,885.24 had been received during the year from various sources and \$8,253.52 expended.

The report of the Director of the Museum briefly related the work performed during the year in the various departments.

The annual report of the Librarian showed that 100 books had been received from the various departments at Washington, 616 from various societies; and there were also 690 donations from individuals.

The Council of the Academy have the privilege of nominating, at the annual election, for honorary life membership, two members who have rendered valuable services to the academy. Four years ago Professor Davidson was elected, and on the following year Dr. H. Behr was chosen. The past two years the Council saw fit to make no nominations. This year, however, they took advantage of their power and nominated Dr. H. W. Harkness, who has distinguished himself by close scientific work in microscopic botany, and Charles G. Yale, who has served continuously as Secretary, gratuitously, for twelve years. Both gentlemen were unanimously elected.

On motion, a vote of thanks was tendered to Mrs. Dr. Curran for her botanical labors in behalf of the association during the past year.

The President read his annual address, and also a paper "On Astronomical Research." From these we shall quote on another occasion.

The Silver King Mine.

The annual meeting of the Silver King Mining Co., of Arizona, was held in this city last week. Colonel James M. Barney, B. A. Barney, J. L. Jones, Dr. W. H. Stanley and Aaron Mason were re-elected Directors. The officers were reappointed as follows: B. A. Barney, President; J. L. Jones, Vice-President; James M. Barney, Treasurer and General Manager; Joseph Nash, Secretary, and Arthur Macy, Superintendent. From the report of the latter it seems that the surface improvements at the mine have been the completion of the ore-house and the setting up of an engine and Blake Rock-breaker therein, the placement of one Sturtevant and one Boston air-blower, with piping. An addition on the east side of the engine-house for an engine, which furnishes power for the saw-mills, drives blasts and ventilating centrifugal blowers, furnishing air blast for the forges and occasional extra ventilation for the mine, as well as supplies power for drilling, nut and bolt cutting machines. An office building, 26x26 feet, two stories high, was completed the latter part of the summer. A much needed new change-house, 20x40 feet, was erected last month. A permanent fire apparatus has been completed, and all the buildings are now protected by seven fire plugs and attached hose and nozzels, placed at the most available points and ready for instant use.

The work in the mine has been confined to the enlarging of the sill floor of the 510 level, the extension of the sill and extraction of ore from the stopes of the 714 level, as well as enlarging the winze between the 612 and 714 levels from 4x4 to 14x14 feet. The shaft has been sunk 102 feet, and a station completed for the 816 level. Nothing has been done on the 612 level, or any of the levels above the 510, so they remain about the same as they were a year ago.

There has been no appreciable change in the amount of water in the mine.

On the 510 level, the sill floor has been extended at intervals, until now its greatest length is 91 feet, and greatest width 72 feet. A stope was started, but only enough ground taken out for one set of timbers. The total space excavated in this level is 37,100 cubic feet, of which 16,996 cubic feet have been taken out this year. It is almost entirely in ore and the sill is now being extended with gratifying results.

The 714 level has been extensively exploited

during the year. The sill floor has been largely extended, offering increased stopping ground. During the year the volume of ground extracted has amounted to 410,418 cubic feet, and the total space excavated amounts to 657,769 cubic feet.

The method of timbering and the dimensions have not been changed. The system of pillars built with waste rock has been extended continuously. The character of the ore has not altered materially. The ventilation has been good excepting during the extreme hot weather, when additional air was carried to the 714 level from a centrifugal blower on the surface.

The consumption of cord wood at the mine has been 941½ cords, costing \$9,679.62, or an average of 2.53 cords at a cost of \$26.51 per day. The present consumption is about 2½ cords per day.

The amount of ore hauled to the mill was 23,172 235-2000 tons.

At the mill to handle the pulp from 20-stamps there are now 12 Frue Vanners, four new ones having been put in during the year. These Vanners are now run by a new special vertical engine.

A six-inch well was sunk to a depth of 150 feet in the early part of the summer on the east side of the mill, for the purpose of increasing the water supply; a Thompson and Evans deep well pump was put into it and now furnishes 1,000 gallons per hour. An artesian well-boring machine has recently been purchased with a view of sinking two additional wells at the mill.

The amount of cord wood consumed during the year at the mill was 3,108 cords, costing \$26,783.06, or an average of 8.51 cords, costing \$73.87 per day.

The general appearance of the mine is very flattering, recent developments having exceeded my best anticipations. The close of the year finds us with a very large reserve of ore at the mill. The ore house and the chutes in the mine are full, and a large quantity broken and ready for sorting.

In the execution of the year's work, material aid and assistance have been given by Messrs. F. H. Blake (metallurgist in charge at mill), Robert Bowen (mine foreman), J. W. Kenney (chief engineer), and G. L. Voice, Kenneth McKenzie and W. H. Benson. Very respectfully submitted,

ARTHUR MACY, Supt.

Secretary's Report.

The receipts and disbursements from January 1st to December 31, 1883, were as follows:

RECEIPTS.	
Balance on hand.....	\$30,385 67
Sales of Concentrations.....	592,503 53
Total.....	\$621,889 30
DISBURSEMENTS.	
Sampling and assaying.....	8 59 10
Expense.....	22,349 10
Insurance.....	750 00
Law.....	1,012 00
Purchase adjacent mines.....	14,000 00
Freight.....	19,620 81
Merchandise and lumber.....	49,670 18
Superintendent's drafts.....	332,501 46
Dividends.....	175,000 00
Balance on hand.....	25,156 05
Total.....	\$621,889 30

Iridium.

The chief source of iridium is the mineral iridosmine, which occurs in very hard, shining, metallic grains in many placer deposits, associated with gold. The ore consists mainly of the rare metals iridium and osmium, together with smaller quantities of rhodium and ruthenium. Platinum and palladium also are sometimes present. The chief commercial sources of iridosmine are in the Ural mountains; but it occurs also in Brazil, and a considerable amount is brought from California and Oregon. Being as heavy as gold, it accumulates with the latter in the placer washings, and is easily recovered and saved. The harder grains are used in tipping gold pens, and the other portions are converted into iridium oxide. The latter substance serves for a permanent black pigment in decorating fine porcelain.

When iridosmine, which is practically infusible, is heated to whiteness in contact with phosphorus fusion takes place. The fused product, heated with lime, loses phosphorus, and a subphosphide of iridium is left. At the same time osmium is eliminated by volatilization as oxide. This so-called fused iridium is now manufactured under Holland's patent by the American Iridium Company, of Cincinnati. It is steel-white in color, harder than steel or even agate, is practically infusible in any furnace, is insoluble in the strongest acids, and incapable of rusting. These properties are likely to create a demand for iridium, which is now being introduced into commerce for a variety of purposes. It is not only used for gold pens and for the points of stylographs, but also for the knife edges of fine balances, for the tips of rubber-burning tools, for wire draw-plates, etc. Recently Prof. W. L. Dudley, of Cincinnati, has succeeded in electroplating with iridium, and has obtained excellent results.

To a considerable extent iridium is alloyed with the platinum used for chemical purposes, inasmuch as it gives the latter metal increased rigidity and hardness. The standard meters of the International Commission on Weights and Measures consist of ninety parts of platinum to ten of iridium.

Crude iridosmine is now worth from \$2 to \$5 per troy ounce, according to purity. "Fused iridium" sells at about \$10, pure iridium (refined only abroad) at about \$20.

THE ENGINEER.

The Corinth Canal.

Some further details have been received respecting the ship canal now being cut, in the most literal sense of the word, through the Isthmus of Corinth. The actual length of the canal, when finished, will be just under four miles. The entrances to the canal will be 328 feet wide, diminishing to 72 feet, the depth being 26 feet. The nature of the ground through which this canal has to be cut is composed of three distinct kinds: firstly, from the Gulf of Corinth, through a plain consisting of sand and alluvial soil, for a distance of just over three-quarters of a mile; secondly, through a mountain range, varying in height from 130 to 260 feet, of the length of 2½ miles; thirdly, beyond the mountain range to the sea, in the Bay of Calamaki, the proposed canal will traverse a little plain of the length of about two-thirds of a mile, composed of alluvial soil and rocks. The contract price of the work is about \$5,000,000.

ANOTHER triumph of American engineering over natural difficulties is the cantilever bridge across the Niagara river. This is one of the most remarkable works of modern times, and has the longest double track span in the world—900 feet over the river—and will be opened to travel early in December. The idea of spanning the deep gorge of the Niagara with a bridge built out with arms approaching each other from opposite shores was a bold one. But the work has been prosecuted without serious mishap or delay, and the first railroad bridge on this principle is now so nearly finished that it is pronounced a completely successful undertaking. The building of the bridge has been regarded with great interest by engineers and railway managers in various parts of the world. Every American will take an honest pride in this grand achievement of his countrymen.

MAMMOTH PNEUMATIC TUBE.—One of the most extensive schemes yet devised, and one which, if it should prove successful, will be one of the most beneficial, is the proposition to construct a pneumatic tube between New York and Chicago for the purpose of transmitting letters, grain samples, jewelry and other small, light packages. Way stations will be established at Cleveland, Buffalo and other points. The pipes will be of iron, four inches in circumference, and the cost of laying them is estimated at \$4,000 per mile. The price for carriage will be five cents for letters and ten cents for parcels, and the boxes holding the goods will make the trip between the two points, it is believed, in four hours.

RAILROADS IN 1883.—The advance sheets of *Poor's Railway Manual* for 1883 show a mileage at the close of 1882 of 113,329 miles, 11,591 having been constructed within the year. The average mileage operated for the year was 107,158. The amount of share capital issued by the several companies up to the close of their respective fiscal years was \$3,456,078,196, an increase from the previous year of \$385,254,585. The funded debts of the several companies amounted to \$3,184,415,201, an increase from the previous year of \$352,554,496.

AN IMMENSE DAM.—A French engineer in Brazil has lately been selected to construct what will probably be, when completed, the largest dam in the world. The main dam will be 940 feet long by 58 feet high, and two smaller ones will close side depressions. This work will, it is calculated, back the water over 1,500 acres, and retain 14,000,000 cubic meters of water, sufficient to provide for all the cattle of the regions during three years, and for the irrigation of 5,000 acres of flat bottom land alongside the river bed below. The rivers of Ceara flow in the wet season alone.

A SECOND FOUR TRACK RAILROAD.—The Pennsylvania Railroad Company is steadily extending the third and fourth tracks on its main line, in order to facilitate the movement of the enormous traffic it is now handling, and which is constantly growing. The company is not only using all its available cars but has been compelled to lease from other companies several hundred freight cars while additional rolling stock is being built. The Pennsylvania is now the largest coal and coke carrier in the United States.

THE ELECTRIC LIGHT.—More than a dozen steamers plying between New York and Liverpool are fitted up with electric lighting machinery. Probably three times as many are so fitted out on the various other lines of ocean-going steamships. The British steamers are largely supplied with the Siemens and Swan apparatus but the other systems are well represented.

EXTENSIVE PROJECTS.—In addition to the scheme for bridging over the Straits of Messina, other projects in connection with the same matter are before the attention of the Italian government. A large ferry to contain twenty-four railway carriages has been proposed to the Ministry of Public Works, by Signor Colabretto. A tunnel is also spoken of, the construction of which is estimated to cost \$15,000,000.

USEFUL INFORMATION.

Imitations of Costly Leather.

The custom of carrying lunch reticules, money purses, and traveling bags of leather has made an increased demand for the leather from rare animals, or for leather of attractive appearance. As the natural supply of alligator and the great python or boa skins is not sufficient to keep up with the demand, these skins—or the leathers from them—are imitated very largely by using the leather of commoner and cheaper skins. Even seal leather, goat leather, and kid leather, or morocco, are imitated. The surface of alligator leather consists of almost exact rectangles or squares, separated by deep furrows, the squares gradually diminishing in size as they recede from the center of the skin. The boa leather is in diamond shaped patches, forming a fine network, and is very elegant, the division lines being very fine. Seal skin leather is a fine diapered or arabesque pattern of irregular divisions raised and depressed. Goat leather is crossed in regular lines at acute angles, forming minute elongated diamonds.

As some of these leathers are too costly to be furnished at low prices, the million who desire the best, but cannot always afford the cost, are supplied by fair imitations which are not as durable as the genuine, serving in part the purposes of the costly leathers. These imitations are made by the aid of photography. A genuine seal, alligator, boa, or other costly skin is photographed, then printed on sensitive gelatine, the parts not acted upon by light dissolved out in water, and a cast or an electrolyte plate then made in copper or type metal, as practised in the reproduction of engravings, and then the metal plate and the smooth leather of some domestic animal are passed between rollers under pressure, and the figure on the plate is permanently fixed on the leather by great pressure. Any of these leathers may be stained, colored, or dyed to any tint desired; but plain black or the color left by the tannin is generally preferred. —*Scientific American*.

China Still Ahead.

It is claimed for many important inventions of both America and Europe that they are merely re-inventions that have been known in China for centuries. Now comes Dr. Macgowan, a resident of China for thirty years or more, who says in a communication to the *North China Herald*, that illuminating paint has long been known, made and used in that country. The Chinese use powdered muscle shells instead of oyster shells in the manufacture of the paint. He says the invention is quite ancient; that the emperor, Tai Tsung, who flourished towards the end of the tenth century of the Christian era, received a picture which was luminous by night. The picture represented, by night, a cow lying within a fence, while by day the cow appeared as browsing outside of the inclosure. His majesty asked for an explanation from his ministers, but they were no better informed than he. At length some one informed the emperor that the effect was produced by mixing Southern Sea pearl-paste with a pigment which at night became luminous; and that the day picture was made of a powdered reef-stone. In after ages the picture was attributed to the genii, whilst some denied its existence altogether. Dr. Macgowan shows, by extracts from a Chinese writer of three centuries ago, that the tradition of the art had not died out.

EAST INDIAN WOODS.—The *London Timber Trades Journal* has the following regarding East India furniture woods: Teak wood is light, soft and red, and has no heartwood. It is not eaten by white ants, and is highly valued and universally used for furniture of all kinds, and for door panels and carving. In Bengal and Assam it is the chief wood for making tea boxes, but is getting scarce on account of the heavy demand. Chickeraasi or Chikrassi wood is a large tree with bark reddish-brown and deeply cracked. The heartwood is hard, varying from yellowish to reddish-brown, with a beautiful satin lustre. It seasons and works well, and is used for furniture and carving. Nagasar wood has dark-red heartwood, extremely hard. It is used for building, for bridges, gun-stocks and tool-handles; but its more general use is prevented by its great hardness, weight, and the difficulty of working it. Pitraj wood is reddish, hard, close, and even-grained, but is little used. In Chittagong, canoes are sometime made of it. Kandeb wood is light red, shining, cross-grained and moderately hard. It is used largely in Chittagong for masts, spars and rafters, and sometimes for small boat building.

THE STRUCTURE OF HAIR.—A single hair now enables the anthropologist to judge in what division of the human species he will class its owner: there is no mistaking a Chinese for a European, or either for an African. The cross section of this single hair, examined microscopically by Pruner's method, shows it circular, or oval, or reniform. Its follicle curvature may be estimated by the average diameter of the curls, as proposed by Moseley; its coloring matter may be estimated by Sorby's method. There has been even a systematic classification of man published by Dr. W. Miller, of the Novara expedition, which is primarily arranged according

to hair, in straight haired races, curly haired races, etc., with a secondary division according to language. Though we cannot regard such a system as good, the wonder is that it should answer so well as it does; indeed, nothing could prove more clearly how real race distinctions are than a single bodily character should form a basis for rationally mapping out the divisions of mankind.—*E. B. Taylor, in Natur*.

MAHOGANY.—The manufacture of mahogany furniture has, perhaps, increased four-fold within the last two years. This increase comes from the demand for high-priced furniture, as well as from the deterioration and scarcity of black walnut. This beautiful wood is now largely being made use of for interior finish—many of the finer houses, banks, insurance offices, etc., being finished with it. Its use is entering rapidly into the construction of railway carriages—a source of demand uniformly good for hard woods. The chief sources of mahogany are Mexico and the West Indies, and the United States takes 25 to 30 per cent of the whole exports.

BULGING OF RIFLE BARRELS.—A board of officers have tested a lot of rifles at the Springfield Armory to determine the cause of the bulging of the barrel, which occasionally occurs in practice. They find it due to the fact that the muzzle has been stopped by sand, caused by resting the muzzle in wet sand, or in dry sand after the gun has become foul from firing. This arrests the passage of the ball, so that the pressure is increased at the point of swelling. It is curious that sand produced this result where wooden plugs, driven in tightly and swelled by steam, failed to do so.

MUTUAL ANTAGONISM IN WOOD.—It is interesting, and may be instructive to some, to learn that certain kinds of woods, although of great durability in themselves, act upon each other in such a way as to produce mutual destruction. Experiments with cypress and walnut, and cypress and cedar prove that they will rot each other while joined together, but on separation the rot will cease and the timbers remain perfectly sound for a long time.

SHRINKAGE in lumber varies according to the tree from which it is made. Oaks will shrink in drying one-half inch to the foot; while the redwoods of California show no perceptible change, and the heavy Eastern or South American woods lose but little.

GOOD HEALTH.

Salicylic Acid as a Preservative.

The very extensive use of salicylic acid as a preservative of foods, wine, beer, cider, etc., and its use internally in the form of salicylate of soda as a medicine, especially for rheumatism, has been the subject of no inconsiderable discussion in medical journals, and among the medical profession in general.

The French Society of Hygiene recently made it a matter of extended discussion, in the course of which it was claimed by M. Durand that the addition of salicylic acid to beverages should be considered a punishable fraud, unless a label clearly indicating its presence was placed on the vessel. While salicylic acid is a very desirable agent for the prevention of fermentation in certain industries and as a medicine in some diseases, its use should be restricted to these two objects.

It was urged that this acid has a very unfortunate influence upon the human system, giving rise to affections of the ear and even sometimes producing complete deafness.

The society after consideration appointed a committee to investigate the subject, who reported as follows: "After having carefully considered this subject and studying the analysis of several substances containing salicylic acid, the committee would report that they find this substance dangerous, not only from the pernicious effect which it produces on the system, but also because its use permits the fraudulent introduction into foods of other objectionable materials, more or less unhealthy, especially in the wines of dried grapes and in beer. The committee concluded that any alimentary substance, solid or liquid, containing the slightest quantity whatsoever of salicylic acid or of its derivations should be considered dangerous, and that its sale ought to be prevented by law."

The French Minister of Agriculture and Commerce incorporated the above report in an edict which he has just issued, asking the prefects of the different departments to adopt proper measures for the suppression of the sale of articles containing salicylic acid.

On the other hand a very prominent German journal pertinently comments on the French edict by observing that the latest researches of Prof. Kolbe ("which appear to be entirely unknown to the French") very clearly prove that salicylic acid in the quantities used for the preservation of food is entirely safe, and that no second thought need be given to its employment.

The Prof. Kolbe above alluded to, has discovered a new and synthetical method of preparing this substance from coal tar, instead of from willow, as its name indicates. Whether this circumstance has an influence in prejudicing his mind in its favor is a matter which perhaps, should be health taken into consid-

eration. But our readers have now both the French and German side of the question, and must determine the matter for themselves, or await further investigation.

Reflex Nervous Influence.

It has oftentimes been cast up to physicians, by those who ought to know better, that the mysterious and ill-defined influence of "reflex action," is utilized as a shield to cover ignorance, and as a loophole to crawl through and escape when confronted with a morbid condition, the intimate nature and etiology of which they are unable to fathom.

That some men have availed themselves of this convenient and comprehensive term is undoubtedly true; but that such a thing as reflex action is a reality, and that it is a much more potent etiological factor of disease than is ordinarily believed, is also true.

By reflex action we mean that an impression made upon some nerve termination in one portion of the body is carried along this nerve to a center, and from there reflected, as it were, along some other nerve to a part of the body remote from the point of first impression, at which latter point its power to disorder healthy action is made manifest, while no morbid phenomena are observable at the point from which the irritation has really arisen.

This is a plain definition of "reflex action," devoid of all technical and superfluous words; and that diseased conditions frequently have such origin, no one of experience will deny.

But the general practitioner, we fear, does not take this factor sufficiently into consideration in the formation of his opinion of the cause of disease, and since, therefore, his remedies are directed rather to the effect than to the cause of the effect, he is met oftentimes with failure, when, did he but realize the actual influence of reflex action, and look to the proper point for his cause, and guide his therapeutics accordingly, he would have much better results.—*Med. and Surg. Reporter*.

THE PHENOMENA OF DEATH.—A Philadelphia physician has made a special study of the phenomena of death, both through his personal observations and those of others, and his conclusion is that dissolution is painless. "I mean," he explains, "that it approaches as unconsciously as sleep. The soul leaves the world as painlessly as it enters it. Whatever be the cause of death, whether by lingering malady or sudden violence, dissolution comes either through syncope or asphyxia. In the latter case, when resulting from disease, the struggle is long protracted, and accompanied by all the visible marks of agony which the imagination associates with the closing scene of life. Death does not strike all the organs of the body at the same time, and the lungs are the last to give up the performance of their functions. As death approaches, the latter gradually become more and more oppressed; hence the rattle. Nor is the contact sufficiently perfect to change the black venous into the red arterial blood. An unprepared fluid consequently issues from the lungs into the heart, and is thence transmitted to every other organ in the body. The brain receives it, and its energies appear to be lulled thereby into sleep—generally tranquil sleep—filled with dreams which impel the dying to murmur out the names of friends, and the occupations and recollections of life."

A NEW TREATMENT FOR NEURALGIA.—The latest agent introduced for the relief of neuralgia is a one per cent solution of hyperosmic acid, administered by subcutaneous injection. It has been employed in Billroth's clinic in a few cases. One of the patients had been a martyr to sciatica for years, and had tried innumerable remedies, including the application of electricity no fewer than 200 times, while for a whole year he had adopted vegetarianism. Billroth injected the above remedy between the tuber ischii and trochanter, and within a day or two the pain was greatly relieved, and eventually quite disappeared. It would be rash to conclude too much from these results in the face of the intractability of neuralgia to medication, but if it really proves to be as efficacious as considered, hyperosmic acid will be a therapeutic agent of no mean value.—*Lancet*.

DEFENSE OF VIVISECTION.—P. Bert, late Minister of Public Education in France, publishes an article in defense of vivisection. He says that savants do not resort to painful experiments upon the bodies of living animals except with heavy hearts. They do it unwillingly, and are often forced to control their own sufferings while so engaged. They are also bitterly opposed to all perversion and abuse of such experimentation by heartless or incompetent persons. Science, however, he says, cannot dispense with vivisection. It is for the benefit of humanity, and essential to the progress and development of human knowledge, and all efforts to prevent its perversion or abuse by legal restraints and regulations must prove useless and futile.

WATER FOR INFANTS.—Anyone who has ever noticed the avidity with which a fretful, sick infant drinks water and marks the early abatement of febrile and other symptoms, will be convinced that water as a beverage, a quencher of thirst, a physiological necessity in fact, should not be denied to the helpless member of society.—*N. Y. Medical Record*.



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Passing Events.

The Press this week gives its readers many extra pages of interesting matter. Our annual mining review, replete with statistics and information for reference, gives the results of the year's work in the different mining States and Territories. It has been compiled with care and is worthy of perusal by all interested in mining affairs.

We give, also in the form of an additional supplement, the complete debris decision, just rendered, in order that our mining readers may study all the legal points brought against the hydraulic mining industry by the Judges of the Court. The decision is a very lengthy one, but no abstract of it would be satisfactory to those whose interests it affects.

Bright sunshine prevails in these latitudes, to the regret of most Californians, for fears are entertained of a dry winter. Still there is plenty of time yet for an abundant rainfall, and the late rains seem to do great deal of good. To those who have formerly worked hydraulic mines a dry season was unfortunate, but this year the lack of water, should there be a scarcity, will make no difference, as few hydraulic mines will be worked after the old fashion.

MINING IN 1883.

A Review of Operations and Results.

A Summary of Important Doings in the Mining Regions Last Year.

Although within the past year there have been no unusual "booms" or mining excitements which have attracted the special attention of the mining community, there have been many local strikes of importance and numerous gratifying developments in old mines, which we have noted in the Press at the time. The year has been very fairly prosperous, from the miners' point of view, although the aggregate productions of the precious metal has fallen a couple of millions short of what it did the previous year. It may be stated as a gratifying fact that with each year's advancement the public becomes more and more imbued with a knowledge of the importance of the mining industry of the nation, which is more generally recognized as a legitimate factor of our national advancement than formerly. In the newer regions the spirit of speculation and stock-dealing prevails, more or less, as it has elsewhere when the country was being opened. Exaggerated values are apt to be fixed to properties in new camps; so that it is not by any means the case that the newly opened sections are the most prosperous.

The principal interest during the past year has been directed toward Idaho and Montana, and Utah has had a good share of attention as well. In California the doubt as to the result of the debris trial has kept hydraulic mining back. To this subject we refer elsewhere in full. Nevada has had a dull year, and the failure to find any bonanza on the Comstock has discouraged many. Arizona is going ahead on a pretty firm basis. New Mexico is expected to do much better this year than last. Oregon and Washington remain about the same, and Colorado still leads in bullion product, California being second.

The Bullion Product.

Notwithstanding all the "booms" and excitements and rushes, the extensive advertising, the wonderful statements, reported rich strikes, "second Comstocks," and all the similar things of which we hear during the year, it is "bullion that talks." At the close of the year when the aggregate shipments of bullion are put together in the form of tables so that comparisons can be made, it does not by any means follow that those places of which we have heard most are the ones that have achieved the best results. Oftentimes the reports are circulated by well-meaning but ignorant persons, or by those who are interested or excited. Persons with little experience in mining are always apt to overestimate or exaggerate. But the end of the year rectifies all these mistakes, and we are able to see where we stand. Perhaps the table we gave last week, and republish below, will tell the tale of the year in the fewest words. It was compiled by Mr. Valentine, General Superintendent of Wells, Fargo & Co. The first is one showing the product of the year 1883:

STATES AND TERRITORIES.	TOTAL.	Ores and Base Bullion by Freight.	Silver Bullion by Express.	Gold Dust and Bullion by Other Conveyances.	Gold Dust and Bullion by Express.
California	\$15,673,314	\$660,209	\$1,474,748	\$669,109	\$13,132,188
Nevada	\$7,771,621	1,749,774	5,924,262	1,097,595	6,626,667
Oregon	\$9,121,021	879,280	8,241,741	879,280	8,360,461
Idaho	63,626	105,200	351	216,326	105,200
Montana	105,200	1,819,700	107,241	4,000,000	1,819,700
Utah	8,807,000	2,480,000	6,327,000	2,480,000	8,807,000
Arizona	7,017,682	4,587,855	2,429,827	2,429,827	7,017,682
New Mexico	24,310,000	17,531,610	6,778,390	6,778,390	24,310,000
Colorado	3,413,510	2,948,900	464,610	464,610	3,413,510
Washington	\$4,182,743	3,845,630	337,113	337,113	\$4,182,743
Wyoming	2,829,000	2,829,000	0	0	2,829,000
Alaska	6,022,010	5,870,545	151,465	151,465	6,022,010
Totals	\$80,313,612	\$23,872,009	\$23,872,009	\$23,872,009	\$80,313,612

This shows the gross yield of 1883 segregated—so as to show the relative percentage of

gold, silver, lead and copper—to be approximately as follows:

Gold, 32.36 per cent.	\$20,230,492
Silver, 23.30 per cent.	47,229,649
Copper, 6.30 per cent.	5,633,921
Lead, 9.04 per cent.	8,163,550
Total	\$80,313,612

The following table, also compiled by Mr. Valentine, is of interest as showing the product for some years back:

Year.	Gold.	Silver.	Copper.	Lead.
1870	\$1,330,000	\$1,330,000	\$1,330,000	\$1,330,000
1871	1,286,000	1,286,000	1,286,000	1,286,000
1872	1,330,000	1,330,000	1,330,000	1,330,000
1873	1,330,000	1,330,000	1,330,000	1,330,000
1874	1,330,000	1,330,000	1,330,000	1,330,000
1875	1,330,000	1,330,000	1,330,000	1,330,000
1876	1,330,000	1,330,000	1,330,000	1,330,000
1877	1,330,000	1,330,000	1,330,000	1,330,000
1878	1,330,000	1,330,000	1,330,000	1,330,000
1879	1,330,000	1,330,000	1,330,000	1,330,000
1880	1,330,000	1,330,000	1,330,000	1,330,000
1881	1,330,000	1,330,000	1,330,000	1,330,000
1882	1,330,000	1,330,000	1,330,000	1,330,000
1883	1,330,000	1,330,000	1,330,000	1,330,000

In reading further on in this review it will be seen that the estimates vary from this in greater or less degree, but these tables have usually been recognized as the nearest correct, and generally accepted as the best basis on which to make comparisons of results. Local authorities are apt to add a few millions more to each State or Territory than Mr. Valentine does.

Leaving figures aside for a moment, it will be of interest to place the States and Territories in their relative positions numerically so that their ranks may be ascertained and compared. The tables are compiled carefully from statistics obtained by the Government when taking the census. The first table shows the rank, however, in 1882, that already given above showing it in 1883 in figures:

RANK OF STATES AND TERRITORIES IN THE PRODUCTION OF GOLD AND SILVER.

Gold.	Silver.	Total.
1. California.	1. Colorado.	1. Colorado.
2. Colorado.	2. Arizona.	2. California.
3. Idaho.	3. Utah.	3. Nevada.
4. Montana.	4. Nevada.	4. Arizona.
5. Nevada.	5. Montana.	5. Utah.
6. Idaho.	6. Idaho.	6. Montana.
7. Arizona.	7. New Mexico.	7. Idaho.
8. Oregon.	8. California.	8. Dakota.
9. Georgia.	9. Dakota.	9. New Mexico.
10. Utah.	10. Oregon.	10. Oregon.
11. North Carolina.	11. North Carolina.	11. Georgia.
12. New Mexico.	12. North Carolina.	12. North Carolina.
13. Alaska.	13. Alaska.	13. Alaska.
14. Washington.	14. Washington.	14. Washington.
15. South Carolina.	15. South Carolina.	15. South Carolina.
16. Virginia.	16. Virginia.	16. Virginia.
17. Wyoming.	17. Wyoming.	17. Wyoming.

RANK OF THE STATES AND TERRITORIES IN THE PRODUCTION OF GOLD AND SILVER IN THE CENSUS YEAR.

Gold.	Silver.	Total.
1. California.	1. Colorado.	1. Colorado.
2. Nevada.	2. Nevada.	2. California.
3. Idaho.	3. Utah.	3. Nevada.
4. Colorado.	4. Montana.	4. Idaho.
5. Arizona.	5. Arizona.	5. Montana.
6. Idaho.	6. California.	6. Dakota.
7. Oregon.	7. Idaho.	7. Arizona.
8. Utah.	8. New Mexico.	8. Idaho.
9. Arizona.	9. Dakota.	9. Oregon.
10. Washington.	10. Michigan.	10. New Mexico.
11. North Carolina.	11. North Carolina.	11. Washington.
12. Georgia.	12. N. Hampshire.	12. North Carolina.
13. New Mexico.	13. Maine.	13. Georgia.
14. Wyoming.	14. Wyoming.	14. N. Hampshire.
15. South Carolina.	15. Michigan.	15. Michigan.
16. New Hampshire.	16. Virginia.	16. Virginia.
17. Virginia.	17. Alaska.	17. South Carolina.
18. Alaska.	18. Tennessee.	18. Maine.
19. Tennessee.	19. Alaska.	19. Tennessee.
20. Alaska.	20. Tennessee.	20. Alaska.
21. Tennessee.	21. Tennessee.	21. Tennessee.
22. Alaska.	22. Alaska.	22. Alaska.

RANK OF THE STATES AND TERRITORIES IN PRODUCTION OF GOLD AND SILVER, PER SQUARE MILE, IN THE CENSUS YEAR.

Gold.	Silver.	Total.
1. California.	1. Colorado.	1. Colorado.
2. Nevada.	2. Nevada.	2. Nevada.
3. Colorado.	3. Colorado.	3. California.
4. Dakota.	4. Utah.	4. Utah.
5. Idaho.	5. Montana.	5. Montana.
6. Montana.	6. California.	6. Idaho.
7. Oregon.	7. Idaho.	7. Dakota.
8. New Mexico.	8. New Mexico.	8. Arizona.
9. North Carolina.	9. North Carolina.	9. Oregon.
10. Washington.	10. Michigan.	10. New Mexico.
11. Arizona.	11. Maine.	11. N. Hampshire.
12. Georgia.	12. Oregon.	12. North Carolina.
13. New Hampshire.	13. North Carolina.	13. Washington.
14. South Carolina.	14. Georgia.	14. Georgia.
15. New Mexico.	15. Michigan.	15. Michigan.
16. Virginia.	16. South Carolina.	16. South Carolina.
17. Maine.	17. Virginia.	17. Virginia.
18. Alaska.	18. Tennessee.	18. Tennessee.
19. Tennessee.	19. Wyoming.	19. Wyoming.
20. Alaska.	20. Tennessee.	20. Tennessee.
21. Tennessee.	21. Tennessee.	21. Tennessee.
22. Alaska.	22. Alaska.	22. Alaska.

The following table is an interesting one as

the relative production of the States and Territories according to population is given in it:

RANK OF THE STATES AND TERRITORIES IN PRODUCTION OF GOLD AND SILVER, PER CAPITA, IN THE CENSUS YEAR.

Gold.	Silver.	Total.
1. Nevada.	1. Nevada.	1. Nevada.
2. Montana.	2. Colorado.	2. Montana.
3. Idaho.	3. Montana.	3. Colorado.
4. Dakota.	4. Arizona.	4. Arizona.
5. California.	5. Utah.	5. Idaho.
6. Idaho.	6. Utah.	6. Utah.
7. Oregon.	7. New Mexico.	7. Dakota.
8. Arizona.	8. California.	8. California.
9. Utah.	9. Dakota.	9. Oregon.
10. Washington.	10. Oregon.	10. New Mexico.
11. N. Hampshire.	11. N. Hampshire.	11. N. Hampshire.
12. Michigan.	12. Michigan.	12. Wyoming.
13. Alaska.	13. Alaska.	13. Alaska.
14. North Carolina.	14. North Carolina.	14. North Carolina.
15. Georgia.	15. N. Hampshire.	15. N. Hampshire.
16. Georgia.	16. Georgia.	16. Georgia.
17. Michigan.	17. Michigan.	17. Michigan.
18. Maine.	18. Maine.	18. Maine.
19. South Carolina.	19. South Carolina.	19. South Carolina.
20. Tennessee.	20. Tennessee.	20. Tennessee.
21. Virginia.	21. Virginia.	21. Virginia.
22. Alaska.	22. Alaska.	22. Alaska.

The question is often asked as to what is the relative rank of the bullion-producing States and Territories per square mile, and by the number of men. The following tables answer these queries:

AVERAGE PRODUCT OF GOLD AND SILVER IN THE CENSUS YEAR PER SQUARE MILE.

STATES AND TERRITORIES.	GOLD.	SILVER.	TOTAL.
Alabama	80.02	80.02	80.02
Alaska	0.01	0.01	0.01
Arizona	1.87	22.45	24.32
California	108.30	7.27	115.57
Colorado	25.93	159.24	185.22
Dakota	22.17	0.48	22.65
Georgia	1.50	0.01	1.51
Idaho	18.45	5.48	23.93
Maine	0.03	0.22	0.25
Michigan	0.44	0.44	0.88
Montana	12.30	19.89	32.25
Nevada	44.16	112.29	156.45
New Hampshire	1.18	1.72	2.90
New Mexico	0.40	3.20	3.60
North Carolina	2.28	0.03	2.31
Oregon	11.48	0.29	11.77
South Carolina	0.05	0.05	0.10
Tennessee	0.05	0.05	0.10
Utah	3.43	55.82	59.25
Virginia	0.22	0.01	0.23
Washington	1.90	0.01	1.91
Wyoming	0.18	0.01	0.19
U. S. (including Alaska)	9.31	11.44	20.75
U. S. (not including Alaska)	11.03	13.65	24.62
U. S. (including only the States and Territories producing gold and silver, with Alaska)	14.68	18.02	32.70
U. S. (including only the States and Territories producing gold and silver and not including Alaska)	19.44	23.94	43.38
Average for Cal., Nev., Utah, Mont., Dakota, Arizona and Idaho.	33.47	42.74	76.21

AVERAGE PRODUCT OF GOLD AND SILVER IN THE CENSUS YEAR, PER CAPITA.

STATES AND TERRITORIES.	GOLD.	SILVER.	TOTAL.
Alabama	80.001	80.001	80.001
Alaska	0.20	0.20	0.40
Arizona	5.24	897.51	902.75
California	19.83	1.33	21.16
Colorado	13.89	85.10	98.99
Dakota	24.40	0.52	24.92
Georgia	0.05	0.0002	0.05
Idaho	45.37	14.25	59.62
Maine	0.005	0.011	0.016
Michigan	0.02	0.02	0.04
Montana	46.11	74.10	120.20
Nevada	78.51	159.63	238.14
New Hampshire	0.03	0.05	0.08
New Mexico	0.41	3.28	3.69
North Carolina	0.08	0.0001	0.08
Oregon	0.28	0.10	0.38
South Carolina	0.01	0.01	0.02
Tennessee	0.001	0.001	0.002
Utah	0.03	32.94	33.97
Virginia	0.000	0.000	0.000
Washington	1.81	0.01	1.82
Wyoming	0.83	0.03	0.86
U. S. (including Alaska)	0.06	0.82	0.88
U. S. (not including Alaska)	0.06	0.82	0.88
U. S. (including only the States and Territories producing gold and silver, with Alaska)	2.60	3.20	5.80
U. S. (including only the States and Territories producing gold and silver and not including Alaska)	2.61	3.21	5.82
Average for Cal., Nev., Utah, Mont., Dakota, Arizona and Idaho.	21.04	23.87	44.91

GOLD AND SILVER OF DOMESTIC PRODUCTION DEPOSITED AT THE MINTS AND ASSAY OFFICES FROM THEIR ORGANIZATION TO THE CLOSE OF THE CALENDAR YEAR ENDED DECEMBER 31, 1882.

State or Territory.	Gold.	Silver.	Total.
Alabama	8,222,562 41	811 10	8,222,563 49
Alaska	78,275 65	446 55	78,722 22
Arizona	3,106,045 18	11,734,417 01	14,840,462 19
California	729,100,000 71	2,793,422 22	731,893,422 93
Colorado	40,637,473 70	22,217,351 06	62,854,824 76
Dakota	15,741,518 10	10,128 16	15,751,646 26
Georgia	7,983,172 85	1,211 71	7,984,384 56
Idaho	25,716,643 78	1,013,053 78	26,729,697 56
Indiana	49 13	40 13	89 26
Iowa	5,516 82	21 38	5,538 24
Maryland	1,600 14	77	1,600 91
Massachusetts	917 56	917 56	1,835 12
Michigan	129 11	3,516,536 79	3,516,665 90
Minnesota	52,462,123 43	74,255 51	52,536,378 94
Montana	17,100,420 63	83,891,671 19	100,992,091 82
N. Hampshire	11,029 55	11,029 55	22,059 10
N. Mexico	1,729,320 75	4,024,912 46	5,754,233 21
North Carolina	10,786,647 58	46,916 85	10,833,564 43
Oregon	17,532,585 33	11,335 35	17,543,920 68
South Carolina	1,445,873 17	246 53	1,446,119 70
Tennessee	86,734 19	5 74	86,739 93
Texas	584,323 28	14,663,323 25	15,247,646 53
Vermont	10,861 27	43 50	11,024 77
Virginia	1,703,282 20	136 27	1,703,418 47
Wash. Terr.	241,366 74	11,827 24	253,194 98
Wyoming	72,033 00	58 24	72,091 24
Reduced bullion	240,030 17	82,441 01	322,471 18
Parted fr silver	16,899,768 48	16,899,768 48	33,799,536 96
Cont'd in silver	9,322,268 97	9,322,268 97	18,644,537 94
Parted fr gold	7,073,251 69	7,073,251 69	14,146,503 38
Cont'd in gold	520,284 71	520,284 71	1,040,569 42
Other sources	70,581,707 34	32,877,370 13	103,459,077 47
Total	1,194,826,232 13	27,110,018 83	1,221,936,250 96

Several tables of total bullion product of the United States have been compiled, but the following is that generally accepted:

ESTIMATE OF THE PRODUCTION OF GOLD AND SILVER FROM 1848 TO 1880, INCLUSIVE, BY FISCAL YEARS, AS GENERALLY ACCEPTED IN OFFICIAL REPORTS.

Years.	Gold.	Silver.	Total Gold and Silver.
1848	\$10,000,000	800,000	\$10,800,000
1849	10,000,000	800,000	10,800,000
1850	10,000,000	800,000	10,800,000
1851	10,000,000	800,000	10,800,000
1852	10,000,000	800,000	10,800,000
1853	10,000,000	800,000	10,800,000
1854	10,000,000	800,000	10,800,000
1855	10,000,000	800,000	10,800,000
1856	10,000,000	800,000	10,800,000
1857	10,000,000	800,000	10,800,000
1858	10,000,000	800,000	10,800,000
1859	10,000,000	800,000	10,800,000
1860	10,000,000	800,000	10,800,000
1861	10,000,000	800,000	10,800,000
1862	10,000,000	800,000	10,800,000
1863	10,000,000	800,000	10,800,000
1864	10,000,000	800,000	10,800,000
1865	10,000,000	800,000	10,800,000
1866	10,000,000	800,000	10,800,000
1867	10,000,000	800,000	10,800,000
1868	10,000,000	800,000	10,800,000
1869	10,000,000	800,000	10,800,000
1870	10,000,000	800,000	10,800,000
1871	10,000,000	800,000	10,800,000
1872	10,000,000	800,000	10,800,000
1873	10,000,000	800,000	10,800,000
1874	10,000,000	800,000	10,800,000
1875	10,000,000	800,000	10,800,000
1876	10,000,000	800,000	10,800,000
1877	10,000,000	800,000	10,800,000
1878	10,000,000	800,000	10,800,000
1879	10,000,000	800,000	10,800,000
1880	10,000,000	800,000	10,800,000
Total	\$1,520,041,532	\$490,422,200	\$1,980,463,732

Up to June 30, 1883, the aggregate production of gold in the United States may be stated at \$1,632,364,670, and of silver \$598,083,217, making a grand total of \$2,230,447,887. Reduced to equivalent weight the total gold output has been 78,963,572 troy ounces, or 2,707.4 avoirdupois net tons. The total for silver represents 462,590,469 troy ounces, or 15,860 tons. It will, perhaps, convey little meaning to say that the grand total is in excess of the national debt; but a better conception of the vastness of the amount may be had by considering that all the gold produced in the country up to the present time, if brought together, would suffice to load 271 ordinary freight cars; the silver, supposed in the same way to be collected together as pure bullion, would require 1,586 cars for its transportation. The gold would tax the carrying capacity of a large ocean steamship, while the silver would suffice to form cargoes for a small fleet.

Of course this by no means covers all our mineral products. There are many other things, as copper, lead, iron, salt, borax, mica, manzanese, asbestos, sulphur, asphaltum, zinc, nickel, quicksilver, antimony, platinum and coal, etc., which are not figured in. The total metallic and non-metallic products of the United States in 1882 were valued at \$453,912,406. But in this article we are only considering the precious metal productions.

CALIFORNIA.

Adopting the figures of Jno. J. Valentine, Superintendent of Wells, Fargo & Co.'s Express, California's product of bullion for 1883 was the lowest made in the history of the State, being \$659,184 less than the output of the preceding year, which up to that time had been the lowest made. Without rejecting Mr. Valentine's estimate as being too low, it may be stated that consulting those emanating from the newspaper press and other authorities in the mines, the year's product would appear to have been much larger than estimated by him, amounting to fully \$18,000,000. In verification of this state-

ment we give below the production made last year by the several mining counties of the State, as nearly as we can make out the same, consulting the local sources of information referred to:

County.	Gold.	Silver.	Total.
Alpine	\$10,000	\$20,000	\$30,000
Amador	2,000,000	2,000,000	4,000,000
Butte	500,000	500,000	1,000,000
Calaveras	700,000	700,000	1,400,000
Colusa	3,000	3,000	6,000
Del Norte	250,000	250,000	500,000
El Dorado	700,000	700,000	1,400,000
Fresno	100,000	20,000	120,000
Humboldt	100,000	100,000	200,000
Inyo	200,000	20,000	220,000
Kern	200,000	20,000	220,000
Lassen	150,000	20,000	170,000
Los Angeles	20,000	80,000	100,000
Mariposa	250,000	5,000	255,000
Merced	10,000	10,000	20,000
Monro	1,500,000	400,000	1,900,000
Nevada	3,200,000	10,000	3,210,000
Placer	600,000	900,000	1,500,000
Plumas	1,000,000	1,000,000	2,000,000
Sacramento	300,000	300,000	600,000
San Bernardino	300,000	1,000,000	1,300,000
San Diego	100,000	100,000	200,000
San Luis Obispo	5,000	5,000	10,000
Shasta	300,000	80,000	380,000
Sierra	1,000,000	1,000,000	2,000,000
Siskiyou	700,000	700,000	1,400,000
Stanislaus	75,000	15,000	90,000
Sutro	10,000	10,000	20,000
Tulare	5,000	5,000	10,000
Tuolumne	400,000	400,000	800,000
Yuba	600,000	600,000	1,200,000
Total	\$10,088,000	\$1,870,000	\$12,958,000

We are aware that in some instances much more has been claimed for these counties than they are credited with in the above table, but from all we can gather we incline to the opinion that the figures here given are not much out of the way. We leave certain of the silver-producing counties, which claim to have taken out over two million dollars worth of that metal last year, to reconcile such claim as best they can with the figures of Mr. Valentine, who puts down the entire silver production of the year, ores and base bullion included, at \$1,832,017 for the entire State.

We herewith append a table showing the total and annual bullion production of California, gold and silver included, from 1848 to the end of 1883. As this table has been compiled with great care, the figures given may be accepted as approximately correct—as nearly correct, perhaps, as it is possible to make them, though it may be that we have placed the product of 1883 a little too high.

Year.	Gold.	Silver.	Total.
1848	\$5,000,000	800,000	\$5,800,000
1849	5,000,000	800,000	5,800,000
1850	5,000,000	800,000	5,800,000
1851	5,000,000	800,000	5,800,000
1852	5,000,000	800,000	5,800,000
1853	5,000,000	800,000	5,800,000
1854	5,000,000	800,000	5,800,000
1855	5,000,000	800,000	5,800,000
1856	5,000,000	800,000	5,800,000
1857	5,000,000	800,000	5,800,000
1858	5,000,000	800,000	5,800,000
1859	5,000,000	800,000	5,800,000
1860	5,000,000	800,000	5,800,000
1861	5,000,000	800,000	5,800,000
1862	5,000,000	800,000	5,800,000
1863	5,000,000	800,000	5,800,000
1864	5,000,000	800,000	5,800,000
1865	5,000,000	800,000	5,800,000
1866	5,000,000	800,000	5,800,000
1867	5,000,000	800,000	5,800,000
1868	5,000,000	800,000	5,800,000
1869	5,000,000	800,000	5,800,000
1870	5,000,000	800,000	5,800,000
1871	5,000,000	800,000	5,800,000
1872	5,000,000	800,000	5,800,000
1873	5,000,000	800,000	5,800,000
1874	5,000,000	800,000	5,800,000
1875	5,000,000	800,000	5,800,000
1876	5,000,000	800,000	5,800,000
1877	5,000,000	800,000	5,800,000
1878	5,000,000	800,000	5,800,000
1879	5,000,000	800,000	5,800,000
1880	5,000,000	800,000	5,800,000
1881	5,000,000	800,000	5,800,000
1882	5,000,000	800,000	5,800,000
1883	5,000,000	800,000	5,800,000
Total	\$1,231,850,000	\$20,150,000	\$1,252,000,000

As a general thing, because California has been in the mining business so many years and so little stir or advertising about her mineral resources is done, the other States and Territories are rather inclined to "snub her," and an impression prevails that mining in California is played out. Still, at the end of each year when the results are figured up, California comes up smiling as still No. 1 in the list of gold producers, and No. 2 in the totals. Colorado leads her this year, as last, in the total product; but California comes second, and is about \$6,000,000 ahead of the next below her, which is Montana. In the production of gold California yielded \$13,182,188, while the total gold yield of all was only \$24,823,317. Therefore, California produced several millions in gold more than all the other States and Territories put together.

There have been no "booms," no rushes or speculative spirits in the State during the year. In fact, the mining industry of California has been depressed somewhat in 1883. Yet with all the difficulties she still retains her record

place among the bullion producers of the United States. This is a good proof that honest, legitimate mining pays, and that it is not necessary to get up a great excitement in order to get out bullion. More or less talk about California's decayed mining interests has been indulged in, but, as we have said before, "bullion talks." The new regions of the country have much work before them in building railroads, towns, etc., which we have accomplished; but it took us a long time to do these things. But for the lack of water and the mining debris litigation we should have had several millions more of bullion in 1883.

The decision on this debris question we publish in full in this number of the Press, and under the heading of hydraulic mining refer more fully to the subject. Our bullion will be somewhat decreased by the stoppage of some of these hydraulic mines, but drift and river mining will keep up our surface work, and more or less hydraulic mining will be done also. The quartz mines of the State are being more and more developed and their yield is increasing. New sections have been opened within the past few years which are now producing steadily, and our quartz interests may be said to be in good condition. We have from week to week during the year devoted a large part of the space in our mining summary to the current news concerning California mines, so it is not necessary now to go very much into detail concerning our various districts.

California produces some considerable copper, though her product in this is insignificant as compared with other regions.

Of borax, however, there is a large production. Up to June, 1883, this State had produced 17,857,980 pounds of borax. Of all of California's product 15,625,732 pounds were produced by the San Bernardino Borax Mining Co. The cost of production varies materially. The State Mining Bureau has issued a monograph on this subject by H. G. Hanks, which goes into the borax business at great length, giving yield, processes, points of occurrence, etc.

California is also a large producer of salt. There are some 25 companies operating, producing about 30,000 tons a year. Our asphaltum, lead, sulphur, manganese, chrome, and a number of such products greatly swell our mining yield.

Until within the past few years California has produced no iron, but now it has one mine at Hotelling, near Clipper Gap, Placer Co., owned by the California Iron and Steel Co. The mine produced 4,500 tons of iron in 1881. In 1882 990 tons were made when the works burned down. The works were rebuilt, and have been in operation since May, 1883. From that time to December 2d the product was 7,416 tons, all of which is consumed here. The product of iron from these furnaces is of a superior quality, and now has preference over any brought to the coast. The Central Pacific Railroad Company uses it quite extensively, taking regularly 200 tons a month for making car wheels and other work.

Of the present operations of the company, the Grass Valley Union says: The operations of the iron company at Hotelling are growing in importance, and are being conducted on an extensive scale. The number of men engaged at the furnace, mining out the ore, burning charcoal, cutting timber, teaming, and in other ways connected with the business, number well up towards 300 men. Teams are constantly engaged in hauling pig iron to the railroad station at Clipper Gap, two and one-half miles distant, where between 7,000 and 8,000 tons are now awaiting shipment. These huge piles of metal never fail to attract the attention of passengers on passing railroad trains, who by this means gain some idea of the importance of this new industry in the foothills. A survey of a railroad route has been made between Clipper Gap and Hotelling; but whether the road is soon to be undertaken is not yet announced, but that it will become a necessary adjunct to the business there is no doubt. The company has recently bought large tracts of land from the Central Pacific railroad for the purpose of obtaining wood to burn for charcoal, and has also bought a great deal of standing timber from the individual owners on both sides of Bear river. The consumption of timber for the kilns is enormous, all kinds being used in making charcoal, and in a few years the country around Hotelling for miles will be divested of its timber. The Judson Manufacturing Co. use the product at their

works, and our local foundries make use of it also.

Hydraulic Mining.

For this branch of mining the past has been an unfortunate year in several respects; some of the large companies operating in the more central mining counties have been estopped running by injunctions issued from the courts or by scarcity of water, there having been but little threats of such proceedings. Then a general snow on the mountains the preceding winter, made for this class of miners a short working season all over the State, the run, as compared with ordinary years, having been abridged fully one-third. So far, the present winter, this water dearth has been continued, the hydraulic miners—where permitted to go on—having up to this time done very little. But with all these interferences, drawbacks and delays the condition of this industry, though a little discouraging, is by no means desperate. We see no reason why the hydraulic companies, who have been restrained from running by order of the courts, should not go on and build their retaining dams, and then resume operations, wherever well made dams will so far abate the evil complained of as to justify them in doing so. Then there is the chance of Judge Sawyer's decision being reversed, or at least essentially modified, by the higher courts, relieving, somewhat, the stringency of the present situation. The hydraulic miners of California have brought this business to a high state of perfection, and if suffered to go on unimpeded, would be able to render it not only largely productive, but fairly remunerative hereafter. While labor has been so economized as to greatly reduce current expenses, such gold-saving contrivances have been introduced as avoid much of the waste formerly complained of. To advance this industry and place it on a sound footing has cost much time, money and patient labor; and all will agree that it should not at this stage in its history be crippled without good cause. California can ill afford to have any of her wealth-producing factors even partially suppressed, nor can the contributions from these mines well be spared from the gold stock of the country without great hardship.

The policy pursued by our courts towards the hydraulic mines finds no precedent elsewhere. Other countries possessing auriferous deposits capable of being profitably worked by the hydraulic method, encourage capitalists to open them up and work them to the fullest extent. Investors having engaged in enterprises of this kind in Australia, Central and South America, Africa and other parts of the world, are now in search of California miners to come and take charge of them. These calls emanate from New York, Boston, Chicago and other cities, both in the interior and on the Atlantic seaboard, as well, also, as from London, Paris and other places on the Continent of Europe, showing the high estimation in which this class of mines and miners is held elsewhere.

From Henry G. Hauks, of the State Mining Bureau, we learn that applications have been made to that institution for suitable parties to go to Australia and South America to take charge of hydraulic operations, those in Australia to be conducted for washing both gold and tin. Already a number of our most capable miners have left on missions of this kind. Mr. D. Crittenden recently took his departure from San Francisco for the Transvaal Republic, South Africa, where he goes in the service of an English company who have large interests there. A heavy order from this company for pipes, giants, and other hydraulic apparatus, is now being filled in this city. Mr. Crittenden is accompanied by Messrs. McClelland and Bradshaw, both experienced hydraulic miners on this coast. Mr. Joseph Messerer has for some time past been in Chili, acting in the capacity of superintendent for a hydraulic mining company there. Frederick F. Birge is at present in the United States of Colombia, South America, inspecting hydraulic gravel deposits for an Eastern company. Mr. Birge is a young man of fine character and first class business capacities, being withal a thoroughly trained miner. His selection for the work entrusted to his care is fortunate for his employers. Henry L. Perkins, formerly Superintendent of the North Bloomfield mine, and Thomas Mein, both of whom have had a long experience in our mines, are in Venezuela.

There may be, and probably are, other California miners who have gone abroad in the

Tybo, another of these Nevada camps, which after a successful career suffered partial eclipse. It has also been resurrected to a new life. Valuable ore bodies have lately been developed in the mines there, both old and new. The smelter erected by an Eastern company in the Montezuma district, but which was unable to run in consequence of a sudden and unexpected failure of water, having been removed to another locality, will soon commence operations with the assurance of turning out large quantities of lead-silver bullion. And so, all over the State we hear of

renewed activity or the note of preparation, indicating that Nevada is about to resume her onward march after so long a period of comparative inaction.

Merrimac District.

Merrimac district, near Tuscarora, and better known perhaps as Lone Mountain, is in Elko county. For the facts from this district we are indebted to a correspondent who writes us as follows:

Editor's Press:—As you intend publishing a summary of mining operations during 1883, I send you a few facts concerning Merrimac district. The Merrimac mine has two shafts, each 75 feet deep; also one of 30 feet, all of which show large quantities of good ore. The ore will average 20 per cent copper, and 30 ounces silver, of which there are about 200 tons on the dumps. The ledge is 10 to 15 feet wide with four foot pay ore. The Amy Western has 135 feet of work done, and shows a large body of rich carbonate copper ore averaging 27 per cent copper. There are about 50 tons on the dumps. On the Copper King over 100 feet of work has been done, and there is a large quantity of ore in sight, carrying 25 per cent copper and 30 ounces silver per ton. On the same claim there is a lead carbonate ledge 10 feet wide averaging \$43 per ton in silver and gold. The Relief Mine has 135 feet of workings with a ledge two feet wide carrying ore averaging 24 per cent copper and 50 dollars in silver and gold.

The Melbourne Mine has a ledge 30 feet wide, averaging 14 per cent copper. The shaft is down about 50 feet and there are 100 tons of ore in the dumps. The Copper Queen has ore going as high as five per cent copper, and 16 ounces of silver per ton. The shaft on this claim is 55 feet deep. The above are the leading mines of the district, but in addition there are about 20 very promising locations. A water jacket smelter will probably be erected early this spring, when we anticipate a lively time in Merrimac.

S. G. WESTON.

The famous Consolidated Virginia mine, on the Comstock, has not done much the last year. The annual meeting of the company was held a few days ago. The explorations during the past year have been much interfered with by water encountered in the main south drifts of the 2500 and 2700 levels. This water, however, has shown a material decrease in amount during the last few months.

IDAHO.

More attention has been turned to Idaho during the past year than for many years past. In fact, for two or three seasons the mining interests of this Territory have attracted great attention. Up to that time the growth of the industry was slow, and was much retarded by the bad reputation many of the mines obtained through the manipulation of unscrupulous operators in the San Francisco stock market. Means of communication have been had through the Territory. For the past three or four years, however, Eastern Idaho, from the Salmon river on the north to the lava beds on the south, has been teeming with prospectors and miners; thousands of locations have been made on the Salmon river. Yankee Fork, Sawtooth Range, and Lower Wood River, Little Wood River and Little Lost River mines have been opened and worked, mills and smelting furnaces put up, and bullion is being rapidly produced. Railroads are opening the way to the regions, and many old districts are being worked, while new ones are being opened. The coming season will see a great rush to the Coeur d'Alene placers, which were only known late in the fall. The mining excitement of the year will be in Idaho. In 1882 the product was, according to Mint statistics, \$8,500,000, divided as follows by counties:

County.	Amount.
Alturas.....	\$945,000
Boise.....	310,000
Cassia.....	25,000
Custer.....	1,250,000
Idaho.....	240,000
Lehihi.....	210,000
Nex Perces.....	5,000
Oncida.....	35,000
Owyhee.....	430,000
Shoshone.....	50,000
Total.....	\$3,500,000

Of this total \$1,500,000 was gold, the rest in silver. Idaho is now a great lead producer. Numerous large deposits have been found in the Wood river and adjacent regions, and a number of furnaces have been built. Idaho was supposed to have produced 5,000 tons of lead in 1882. For Idaho, the past year has been marked by many events bringing prosperity with them and the certain promise of a grand future. The Territory, so long isolated and almost unknown, has at length emerged from obscurity, and several thousands of industrious

and enterprising citizens have been added to the permanent population. The inevitable railroad has come, giving rapid and easy communication with the outside world, and bringing many changes, most of which are fraught with immediate good, and all of which must be accepted with well-grounded hope of ultimate benefit. Several good descriptive articles of the Idaho mines appeared in the Salt Lake Tribune of recent date. In the development of the Wood River country the Philadelphia Mining and Smelting Co. has taken an important part. They have very fine works in a central location. The Wood River mining country begins below Bellevue and extends northward to the head of Big Wood river, fifty miles above. Ketchum is located seventeen miles above Bellevue, and taking the mining district at present operated, is almost central to it. To the west, mines extend over to Little Smoky, a distance of twenty-five miles, while to the east, south and north, mines are tributary about the same distance. Just above Ketchum Warm Spring creek enters Wood river.

The Philadelphia Mining and Smelting Co. is composed of men connected with the oil trade, and the officers are E. J. Mathews, President; James M. Rhodes, Vice-President, with a board of directors. G. B. Moulton is the Superintendent of the company in Idaho. Following is a statement of tonnage for the season of 1883: Ore melted, net, 7,550 tons; of this they received from Hailey, 2,380 tons, making output of mines in this immediate vicinity, 5,170 tons; product in bullion, 3,200 tons, with a gross value of \$960,000. It is a notable fact the ores smelted since the works were started in the fall of 1881, have been so rich as to average 149 ounces silver, and paid the seller an average of \$102 per ton. The ores came from eighty-five mines.

Wood River Region.

The country known as Wood River, Idaho, has been prominently before the public for three years or more, and is pretty well known in mining circles; and yet the stories of the marvelous riches of the country are not greater than the reality. Covering a country 100 miles square, there is dispersed immense riches in silver, lead, copper, gold and vast bodies of timber, all of which will yield great wealth to the world. The country is most easily reached from the south through Bellevue, the first and Pioneer town of the district. It is impossible to even enumerate all the mines in the region, and only a few of them can be mentioned. The Minnie Moore employs 22 men; the Queen of the Hill, owned by the Bellevue, M. Co., employs 15 men; the Overland, Humboldt, Monitor, Monday and Penobscot. At Bullion is the Bullion mine, owned by the Wood River Co; Mayflower, Jay Gould; O. K. Eureka, Bates and Boyd Group, Idahoan; then there are the Montana, Mount View, Davitt, Emma and others. But to go through all the mines and enumerate the three or four hundred in Wood River worthy of notice, requires too much space.

From May 26th to November 1st, 1883, there was shipped from Hailey 5,195,100 pounds of bullion and 4,581,900 pounds of ore. Nearly one-third of these shipments of five months and five days were made in October, and the two months of November and December, if added, would bring the total up to about 16,000,000 pounds for the season, while the shipments of ore from Bellevue would add considerable more.

The mines being operated near by and contributing to Ketchum are in the following districts, and distant as follows: It is 12 miles to Hailey, 17 to Bellevue, near which are numerous properties shipping to the Philadelphia smelters; 19 to the great Bullion mines, about the same to the Narrow Ganges, 28 to Galena, 12 to Boyle Mountain, 7 to West Fork mines, 5 to the Lake Creek mine, 6 to mines on Trail creek, 4 to the Elkhorn and Baltimore group, 8 to Green Horn Gulch, 7 to East Fork mines, the North Star, etc., 20 to the iron mines at the head of East Fork, and 60 or 70 to Challis and the mines near there; 12 to 15 miles up Wood river is the Boulder district, where rich gold has been lately discovered in a porphyry belt running through the country, and traceable 15 or 20 miles. This latter discovery was made only late last fall, and promises to open up a new field entirely in Wood River mining.

Little Smoky is one of the leading districts,

and has many promising mines, such as the Smoky Bullion, Ophir, Providence, Blake, First Chance, Buckeye, Fisher, Fourth of July and Pennsylvania. There are several other very promising prospects within a radius of two miles of the Smoky Bullion Co's. mill, and all tributary to the same: the Alturas, Black Tail, Summit, Monarch, Bonanza, California, Illinois and others. About two miles north of the Fourth of July group of mines, on the extreme headwaters of Warm Springs creek and the Smokies, are located the Lone Pine, Deer Trail, Hubson, Maud S., Magnolia and Maggie Campbell, a series of claims owned by Robert Campbell, Thos. Fenton and others. Among others are the Scott and Cobert, Isabella, Carrie Leonard, Tippecanoe, Silver Star, Salamander, King of the West, Winterset and Gaelic.

The Coeur d'Alene Country.

The older mining regions of the Territory, which have been in the shade for some time back, are still working, and are improving too. But it is with the newer ones we are most interested; and of these at present most attention is being turned to the Coeur d'Alene region. Hundreds are now endeavoring to get in over the rough roads and through the snow. They are forming rendezvous along the road so as to get in as early as possible next spring. Along Pritchard and Eagle creeks locations have been made, and more or less work done for an extent of fifteen miles. Pritchard creek runs due east and west for a distance of 25 miles. Eagle creek runs north and south, being 12 miles long and having its source toward Herron Siding. The Bitter-root range of mountains extends almost due north, butting against the Coeur d'Alenes, which turn abruptly to the west. Almost the entire district is covered with timber, mountains and all. Although the country is wild and rough, the mountains do not present the extremely rugged and rocky aspect so noticeable in many mountain regions. At present very few protruding rocks are shown by the upheaval. A gravel formation extends over the mountains to the tops. It is very probable that good quartz mines will be found along the gulches that put into these mountains from the principal creeks. Quartz has already been found along Pritchard creek from the bank to a mile back. The heads of the gulches have not yet been prospected, but the probabilities are that rich mines will be found there. In the broader basins of the principal creeks above the bed rock loose gravel or wash, resembling tailings, constitute the deposit. No clay or like sediment is found in the gravel, and very little sand. The gravel is not coarse, but rather fine. There are few boulders that cannot be easily handled. The bedrock is found at a depth of from one to fifteen feet from the surface. No deep channel of the creek has ever been found, and the miners expect when they do find it to strike good pay gravel. The indications are that it will be in richness much like Williams' creek, Caribou. The rim rock of Pritchard creek resembles greatly that of the former placer mining section.

The only feasible and practicable route to get to the mines, either now or in the spring, is via Rathdrum. The Herron Siding trail is very impracticable and most of the year is impassable. From Rathdrum, by way of Coeur d'Alene City, the topography of the country is such that a greatly superior route is afforded. If the visitor could take a direct line from Rathdrum to the mines he would only be required to travel 45 miles; the route he is obliged to go however, because of formidable mountain ranges, is over 100 miles.

Three grades of gold have been found in the mining district, averaging about \$17, or slightly above, per ounce. This is mainly what is called fine coarse gold, being found in the interstices of the slate and slate bed rock. Some very large nuggets have been found also. It is fully expected that some 25,000 or 30,000 men will go to these new mines in the spring. It must be remembered that quartz mines have been found in the region as well as placers, and more ledges will undoubtedly be discovered when the prospectors can work.

Living is high, cabins are scarce, and those who endure the excessive cold and fatigue of the trail must needs have a long pocket-book to last them till spring. Nothing can be done anyway, and they will be far more comfortable to remain at home attending to business.

UTAH.

Utah has probably shown as much advancement in her mineral development in the past year as any of the Territories or States. The bullion product evinces a very satisfactory increase, and is of greater proportionate percentage than that of any of the other regions. Three or four of the districts are yielding in a wonderful manner, and several of the mines are now world renowned. With such mines as the Ontario, Horn Silver, Eureka, Cave and Crescent, and a host of other steady bullion producers, the Territory is in a position to prove the value of its mineral resources. Salt Lake is growing more and more as a mining center. There is yet a large extent of undeveloped ground in Utah, which will in the future greatly add to the wealth of the world when the region is more fully opened.

Perhaps no better indication of the past year's work could be given than the table of bullion yield from Wells, Fargo & Co.'s statistics which we give in our supplement, opposite page 61.

These figures speak for themselves. Of course it would be impossible to give in a comparatively brief article like this a full review of all the mining districts and mines in Utah. The Salt Lake Tribune, however, published on the 1st inst. a very complete number, giving detailed information from all the camps, in very creditable shape; and from the various letters we have condensed sufficient to give a good general idea of what has been done during the year:

Little Cottonwood is one of the oldest districts of Utah, but it still holds its place among the productive ones. The famous Emma mine is still being worked (by a new company), and very actively, too. Moreover, the old dump which has been worked over two or three times, continues to yield good pay by water concentration. The Joab Lawrence Company, working the Vallejo and North Star mines, have been shipping regularly during the season, and have lately opened up a remarkable body of rich ore. The City Rock group, comprising the City Rock, King of the West, Utah and several other adjacent locations, continues to hold its place at the head of the ore-producing properties, and, in the way of development, surpasses all others combined. Among other prosperous claims are the Gardner-Morrell Co., Grizzly Flat Co., Buffalo Tunnel, Superior, La Pinta, Katie, Lonisa, Sells, Jones & Paddock, Lexington, Norfolk and Boston (owned by Chambers, Colbath, Whipple, Delano and others); Pernvian, owned by James Wall; Moltke, by Henry Wagner; Romulus Tunnel, owned by Albert Thomas and F. Rettrick; Cambrian, by Thomas and Williams; Equitable Tunnel, Alta, owned by C. M. Sukler; Goodrich Tunnel, Nabob, Buckland Tunnel, James Wilson.

Marysville is another section of Utah where there are many mines, among them the Occident, Moore, Silver Hill, Silver Fleece, Fillmore, Elsie, Bully Boy, Webster, Copper Belt, Sonora, Beecher, Cady Stanton, Eucalyptus, Chattanooga, Ferris, Star Mine, Silver Chief, Giles, Red Jacket, Sunday, Ruby and Mattie Rush.

In Frisco district is the famous Horn Silver mine, which has earned an enviable reputation as a bullion producer. The mine, during 1883, shipped from 100 to 150 tons of ore a day to the company's smelters at Franklyn. Developments have gone on steadily during the past twelve months. Major Goodspeed, an expert who has a national reputation, made a personal inspection of the mine during the month of November, and after actual measurement he computed that there were 315,000 tons of ore in sight between the fourth and seventh levels. Active preparations are now being made to sink another working shaft and to put up more powerful machinery. The ledge is as strong on the lowest as it was on the upper levels. Frisco, which is the main mining camp of Southern Utah, is the headquarters of the Frisco Mining and Smelting Co., which has a 50-ton smelter and a dry concentrating mill. The Cactus and Comet mines at Copper Gulch, three miles from Frisco, are in process of development. The latter mine was bought last year by French capitalists.

Beaver Lake district adjoins the San Francisco district. It is only within the last few months that this district has begun to attract the attention of prospectors and mining men

throughout the Territory. The discovery of the Blue Bird, the White Mountain and other valuable finds, which have been made the present year, has created quite a stir among mining men on the coast.

Star district is situated one mile east from the main range, and four miles southwest of the Utah Central Railroad. Among the mines are the Vicksburg, owned by B. Tathan; Minnesota, No. 2, by J. H. Cook and C. T. Martin; Golden Era, by A. G. Campbell and D. H. Cook; Vulcan, by A. G. Campbell and Wm. Sloan; Oneida, by W. S. Seals and I. T. Clark; Cortez and Esmeralda, by C. L. Woodhouse; Monte Christo, by P. L. Orth and I. C. Berkby; Chief, by Forgie Bros.; and the Aerial, by I. H. Cook. All these mines, except the patented ones, have been worked this year.

Big Cottonwood district, which possesses many good mines and prospects, has been quiet for a number of years. Last season a number of new strikes were made, and as a result renewed interest was taken in the district. Prospects which had remained idle for months and years were started up, and every miner considered he had a bonanza at his cabin door. A large amount of money has been expended in the development of the Big Cottonwood mines, and a large amount taken from its rough and rugged hills. More remains awaiting the strong arm of the miner. Among the principal mines are the Reed and Benson, Maxfield, Silver Mountain, Carbonate, Chester and Exchange.

Park City has a reputation for its excellent mineral belt and the amount of bullion produced by its mines. The chief mine of the camp, and one of the best on the continent, is the famous Ontario. The mine is perfectly outfitted with the very best of mining and metallurgical appliances. Among the improvements last year was the drain tunnel 5,763 feet long, which taps the mine in the 600 level. It cost from \$25 to \$30 per foot, but will save \$100,000 a year. There are 300 men in the mine, under Col. Chambers and his assistants, Neal Gilles, James Kirwin, Keith, Foote and Correll. The 40-stamp mill has pounded out \$14,000,000 since it was built in 1877; and this year produced \$2,000,000 of refined bullion. There are 3,000 tons of ore at the mill. Among other mines are the Parley's Park, owned by the Standard Oil Co.; the Empire, Daly group, Black Diamond, Fairview, Crescent, Apex, Silver Key, Roaring Lion (by S. Levy), Council Bluffs, Uintah, Minnie Wheeler, Union, Keystone, Barry Con. (by Lawrence, Treweek, Reed and Barry); Bonhomme, Samson and Woodside. In Pinon canyon are several promising mines, among them the Glenco, owned by Col. Shaughnessy, Fourth of July (by Cook, Shears, Cupel and Brennan); Wasatch East and Homestake. In McHenry gulch are the McHenry mine, Hawkeye (by George Black, John Hughes and others); the Hawkeye, Lowell and Boulder. On White Pine Ridge are the White Pine, Flagstaff, Pioneer (superintended by George Pierson), Minnesota, Utah, James Bonanza and Badger.

In Clifton district not much work was done last year, and what there was the prospectors did. The following properties were worked during the year: Confederate, Holy Terror, I. O. U. (owned by F. J. Kearney); a mica mine owned by W. R. Sheldon, the Hawkeye, John Randolph, Wilson, Pinte and Gold Hill.

Of the Stockton mines it may be said there is a bright outlook, and last year there was a good deal of money produced from old mines under lease. The Honorable Mining Co. (C. E. Mitchener, Supt.) works 25 men, and ships 25 to 100 tons of ore a month. Among others are the Calumet, owned by F. Auerbach and L. Kerckhoff of Salt Lake; King, by W. S. Godbe and B. Hampton, and River owned by G. J. Spitz. The following mines produced more or less ore under leases: Lion, Legal Tender, Rent Valley, Muscatine, Catherine, East Argent, Black Diamond, and King No. 2, Dry Canyon, has turned out considerable money from leased mines. From Ophir district quantities of ore have been shipped.

Bingham, or West Mountain district, one of the oldest in Utah, was worked as a placer camp for a long time, but finally silver-lead ledges were discovered which have since yielded millions. Recent developments are serving to instill new energy into the people. The district is divided into Main Bingham, Carr Fork, Muddy, Highland, Butterfield Canyon, Copper Gulch and Black Jack. Among the many mines are the Winnemucca, Dixon, under lease to Watson & Stanchfield, Trawauke, owned by Goldberg and Shaughnessy, Markham, Nast, owned by Auerbach Bros., Stewart No. 1, (the leading gold quartz mine of the camp), Stewart No. 2, Sacred, Last Chance (S. Bamberger Supt.), True Fissure, Venus and Jupiter, Sunset, Wide West, Elephant, Sunset. At Highland are the J. P., the Alameda, Alladin, Neptune, Jordau, Ashland, Old Utah, Silver Shield, Silver Crown, Hibernia and St. James; the Old Telegraph, a famous mine, is being worked under lease; the Brooklyn (J. J. O'Toole Supt.); the Yosemite is yielding 220 tons a month; the Lead mine, Wasatch and Mayflower are all flourishing mines.

In American Fork they are opening up new mines and developing old ones. The principal mines are: The Miller Mining and Smelting Company mines, comprising the Miller, Wyoming, Alpine, Tonto, Tom Green, Miller West Extension, Sarchfield and Aspinwall, developed by the Carr, Lady Annie, Emeline, Alpine, Wyoming and Mormon tunnels; Mary Ellen,

Live Yankee, Live Yankee First West Extension, Powers and Quartzite, owned by Messrs. Delany, Matt, Cullen, A. Campbell, Burk and O'Brien of Boston and Salt Lake; Silver Bell, Mono, Eudora, First Chance, Henrietta and Red Cloud, owned by the Silver Bell Mining Company, Michael Shaughnessy, President; Russel, Germania and Excelsior; Lady Annie, La Belle, Bredemeyer, Cologne, and Sparrow Hawk, bonded by the Utah Con. Co.; Lady Katherine and Rudolph, bonded by the Utah Con. Co.; Little Cloud or Mountain Lion, owned by Frank Birk, Watson, Chadwick and Co.; Amaryllis and Non-Compromise, owned by the Comstock Co., L. E. Holden, President; Wild Dutchman, Lost Maid, Austin, Cloudburst, Sierra, Echo, Plum, Atlas, Missouri, Orphan, Caribon, Great Western, Rosebud, Pittsburg, War Eagle, etc.

The above mines of American Fork and Silver Lake have produced in the past tens of thousands of tons of good, high-grade ore, and are certainly capable of producing immense quantities more of the best quality. The districts contain the Sultana Smelting Works (three shaft and one reverberatory furnace), fifty charcoal and limekilns, and five saw-mills. The towering mountains are covered with magnificent red and white-pine timber; streams of crystal water rush all the year round from the mountains, giving the finest water power everywhere throughout the districts for any and all purposes connected with and beneficial to mining and the concentration and reduction of ores.

Central Utah is a region embracing some 700 miles of mineral land, and within this area are many mining districts. Nebo district is in limestone. The most prominent mining claims here are owned by Wm. Jennings and Sons and Simon Bamberger & Brothers, of Salt Lake City. The district is well timbered and watered, is near the line of the Utah Central Railway, and in the near future may be expected to rank with the Cottonwoods as one of the lead-silver producing centers of Utah.

The Tintic Mining District comprises an area of something over 100 square miles of the mineralized portion of this mountain range, and in point of development takes precedence of all other mining districts of Central Utah. It is distant from Salt Lake City about 84 miles. The initiative mining is now being done at Eureka Hill. The Eureka Hill Mining Co. have several mines, all at work. Among the prominent mines are the Bullion and Beck, owned by John Beck; Cornucopia, owned by Patric Cusick, of Eureka; Mono, by James Robbins; Northern Spy, owned by the Tintic M. Co., a Chicago organization. The iron mines at Silver City shipped 18,000 tons of iron ore in 1883. Among the mines are the Park, Sunbeam and Elmer Ray, owned by D. S. Dana; the Julian Lane; the Rose of Tintic, Star of India, Josephine and others, owned by the Tintic M. Co.; the Mammoth, the greatest mining property of Tintic; Maxwell Copperopolis, the American Eagle and Crisman Mammoth.

In West Tintic District are the Satan, January, Enid, Shoo Fly, Jersey Lily, Fairview, and many others partly opened. In Desert District are the Red Bird, Copper Star and Camelia. In Oasis District is the Iron Duke. Dugway and Detroit Districts each have many promising mines.

MONTANA.

Montana produced nearly ten millions of dollars last year, thus bringing herself forward to the third place in the bullion-producing regions, eclipsing Arizona, Utah and Nevada, and coming within about six millions of California. This is a record to be proud of. In fact, Montana and Idaho are the only two Territories which show an increase of bullion product for the past year. Montana's relative position as a producer we have referred to in another part of the review more fully. There is some discrepancy in the totals as estimated by the Mint Director, Wells, Fargo & Co., and local authorities, the latter usually placing the figures the highest. The principal mines are those around Butte, which we refer to further on more in detail. Around Helena the placers are pretty well exhausted. The diggings that are being operated are confined mainly to the head of Oro Fino and Grizzly gulches, both tributary to Last Chance gulch.

A Comprehensive Letter.

"The mining interests of Montana are now attracting much attention from men interested in the production of silver, copper and gold. The variety, permanence and magnitude of its resources are but now beginning to be understood; and though the Territory is not indulging in the fictitious and hurtful excitement of a boom, the amount and value of its production are sufficiently important to command the attention of moneyed men both in the East and West."

The above is an expression of opinion made by J. B. Read, the Montana Commissioner, to the Denver Exposition last year, in answer to a question concerning the Territory. It is a brief statement of the present condition. For the following details we are indebted to a correspondent of the Press who is well posted on Montana affairs, and it will be read with interest here in view of the fact that many California capitalists, among them Haggins and Tevis, have lately made heavy investments in that section of the great mineral belt of the

continent. This belt extends north and south through almost the central part of the Territory, covering a very extensive area and embracing the counties of Beaverhead, Madison, Deer Lodge, Silver Bow, Lewis, Clarke and Meagher, with some good mines in isolated localities. In Beaverhead are some very valuable properties, prominent among which are those of the Hecla Company paying regular monthly dividends of \$15,000. The dividends last year amounted to \$180,000. These mines, thoroughly developed and exposing fine bodies of silver-lead ore, are located at Glendale and are owned in Indiana, Governor Hendricks being among the fortunate. Other districts in the county are also shipping considerable ore, particularly the Tidal Wave district.

In Madison county, where the famous Alder Gulch is located—a gulch that has produced \$60,000,000 in gold dust—quartz operations are quite active, and a splendid record is being made. In Deer Lodge county are the Phillipsburg and Cable districts. In the former the Granite Mountain mine shows five feet of \$300 ore at a depth of 300 feet. It is the richest silver mine in Montana, and in a twenty-stamp mill is producing over \$60,000 monthly in bullion 950 fine. In the Cable district the famous Cable gold mine is being worked. A tunnel 2,500 feet long taps the ledge 300 feet deep and crosscuts show the vein of pay ore to be 40 feet wide. From the face of the tunnel drifts have been run 100 feet east and west and the ore body retains its width. A thirty-stamp mill has lately been erected, in which it is the intention of the company to beat seventy tons of ore daily. This amount of ore, which will average \$40 per ton, can be extracted with the greatest ease and a monthly productive capacity of \$80,000 may be considered a very conservative estimate. The property is owned in Des Moines, Iowa, and is regarded as the richest gold mine in Montana. A million dollars would not buy it.

In Lewis and Clarke counties the Gregory, Gloster, Alta Montana group and the Drum Lummou are the best developed, though there are doubtless many unexplored mines there of equal merit. The two first mentioned are owned in Boston, and are shipping regularly. The Gregory is a silver-lead mine, and the Gloster has an extensive run of pay gold ore. By far the most valuable and profitable property in the county, however, is the Drum Lummou, for which an English syndicate last spring paid \$1,500,000. At a depth of 150 feet, the Drum Lummou shows a pay ore body of the remarkable width of 80 feet. From wall to wall its average assay value is \$50, one-half silver and the remainder gold. By experienced mining men it is considered the most remarkable silver gold ore body in the world. It is now being thoroughly explored under the able management of George Atwood. The immense vein has been or soon will be tapped by a tunnel at a depth of 300 feet. The progress of development will be watched with deep interest.

In Northern Montana, the new districts of Barker, Maginnis and Maiden are receiving much attention and contain some very promising mines, both silver and gold. Several mills and smelters are in active operation on good ore, and the erection of others is contemplated. The Clarks Fork mines in Gallatin county, among them the Jay Cooke, Great Republic and others, are being developed with very encouraging results and are rapidly coming to the front.

Butte.

The great mining center of the Territory is Butte, situated in Silver Bow county. In the amount of its production, Butte ranks next to Leadville among the great mining camps of the world. Its output last year was \$7,200,000 in silver, copper and gold, and the facilities for treating ore are being constantly increased. The leading mines of Butte are developed, paying properties, and, while not remarkable for extreme richness, they are wonderfully productive and undoubtedly permanent. They are true fissures in granite, and generally vary in width from ten to fifty feet. The strike of the veins is east and west, the dip south and the walls, in nearly every case, regular and well defined. The ore lies in shoots, dipping invariably to the west. The ores below the water line in all cases are sulphurets. Water is struck usually at about 50 feet from the surface, but is not too abundant to be readily handled by pumps. The ores are of three varieties, viz: silver, copper and those containing both metals in varying proportions. The first mentioned are worked in dry crushing chloridizing mills, and the others by the smelting process. The average value of the silver ores is \$45 and some gold. The average percentage of the copper ores is perhaps 25, though large amounts of 50 and even 75 per cent copper ores are extracted and shipped to Swansea in a crude state. The copper mattes are transported to the same point, where the silver they contain commands a good price. The average daily shipments of copper ore and matte combined aggregate 150 tons. The amount of silver ores treated in the mills exceeds 300 tons daily. A careful and conservative estimate of the realized value of the product of the district in silver, copper and gold is \$25,000 per day.

Considering the amount of money invested, it may be safely stated that neither Leadville nor any other camp ever before made such a showing. The principal companies' mines and reduction works are as follows:

Anaconda copper shaft 800 feet deep, mine fully developed; amount of ore in sight estimated at

nearly 100,000 tons, shipping regularly copper glance to Swansea; steam hoist cost \$90,000; investment up to present time, about \$1,500,000; owners, Haggins and Tevis; Superintendent, Marcus Daly.

Alice silver shaft, 800 feet deep; daily product of company's mines, 90 tons; two mills in operation, 80 stamps in all; owners, Alice Co.; Superintendent, Wm. E. Hall.

Moulton, silver; shaft 500 feet deep; daily product 40 tons; average value \$38; 40-stamp mill in operation; President of company, W. A. Clark.

Lexington, silver; shaft 500 feet deep; two mills, 75 stamps; monthly produce averages \$105,000; first dividend paid in July was 1,000,000 francs; company organized in Paris, France; Superintendent, A. Wartenweiler.

Silver Bow, silver; shaft from 200 to 400 feet deep; mill, 30 stamps; monthly output \$35,000; President, D. A. Talbot.

Dexter Mill, silver; doing custom work; 15 stamps; wet crushing.

Montana Copper Company; smelter capacity, 100 tons daily; mine (the Colusa) 400 feet deep; copper and silver; product daily, 25 tons of matte; product last year \$1,800,000.

Parrot Company copper smelter, capacity 75 tons; mine 400 feet deep; ore body 12 feet wide; shipments of matte, about 12 tons daily; A. F. Migeon, Superintendent.

Williams, smelter, branch of Argo Works, Denver; capacity, 40 tons daily, to be increased this fall one-third, does custom work at high rates; 10,000 tons of ore on the dump; average value of \$50, matte shipments assay 50 per cent copper and from \$600 to 1,500 in silver; production for 1882, \$864,000—a "bear" estimate.

Bull Company, smelter capacity 60 tons; mine well developed to depth of 400 feet; ore, silver and copper, width of vein from 8 to 24 feet; company lately reorganized; James King, President; matte shipments, 10 tons daily, to be increased.

Liquidator, copper; vein 35 feet wide, all pay; shaft 200 feet deep; company now filling a 4,000 ton contract; mine an extension of Colusa; Superintendent, Wm. McDermott.

Shonbar, silver; shaft 250 feet; pay stock from two to six feet; average product \$20,000 per month; ore output worked in custom mill; ore, a black sulphuret; average value \$160 per ton; owner Chas. S. Warren, et al.

Modoc, copper; shaft 200 feet; two levels run; ore body six feet wide; average value 20 per cent copper; Joel Ransome, Superintendent and owner.

Clear Grit, copper silver; shaft 317 feet deep; shows over 30 feet of good copper ore in lowest level, also assays in silver; 75 ton smelter in contemplation; property owned in Philadelphia; Superintendent, Harry C. Kessler.

Original, silver copper; shaft 400 feet deep; pay stock from 3 to 8 feet wide; 27 consecutive monthly dividends paid to date of \$3,000 each; total, \$81,000; President, W. A. Clarke.

Gagnon, silver copper; shaft 500 feet deep; immense body of low grade ore in sight, also 5 feet of \$75 ore carrying 10 per cent copper; product, 40 tons per diem; total product to date over \$1,500,000 during six years; Superintendent and owner, J. C. C. Thornton.

Corra, silver copper; shaft 200 feet deep; drifts show 8 feet of ore assaying 40 ounces in silver, and from 8 to 12 per cent copper; owners, Roundbush & Young.

Poser, silver; shaft 100 feet deep; drifts, east and west show ore breast 18 feet wide, every pound of which pays to mill; its full width is being extracted; average value 30 ounces per ton; owner, W. A. Barnard, a leading quartz operator.

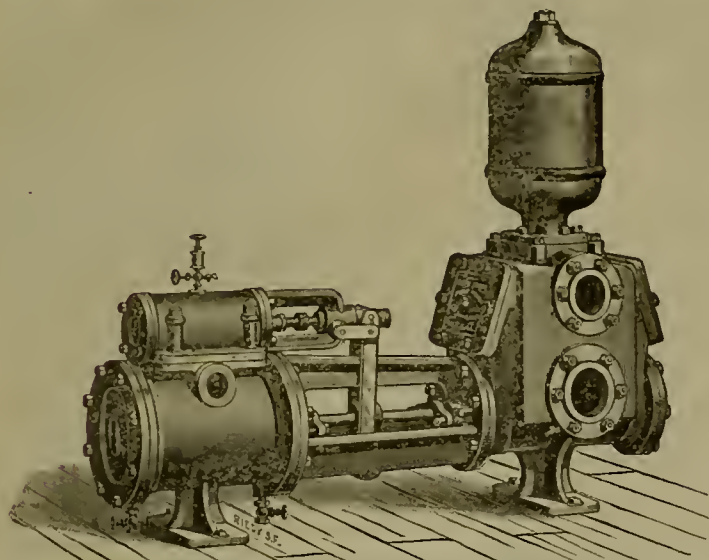
Mountain View, copper; shaft 400 feet deep; ledge supposed to be an extension of the Anaconda, and like the latter, is over 50 feet wide. Important results expected from present development. Owner, C. X. Larabee.

The above are the principal mines now being developed in the Butte district. They are all in active and successful operation. Many other good properties are idle, and some poor ones. It is a fact, however, that all those mines which have given any promise in the surface development have fulfilled the promise on exploration, and it may be safely stated that there has been less money wasted and lost in mining operations in Butte than in any other camp in the world. Butte has never yet received a black eye from a great mining fiasco, and from the present extraordinary productiveness of its mines and their indications of permanence, it is not likely that it ever will. Mining is pursued there on a safe business basis, and chiefly by close corporations and private individuals. The mines are worked in Butte, not in the New York and San Francisco stock exchange. They are exceptional for their extent, regularity and productiveness. Butte is, however, a big company camp. The mines are worked on an extensive scale, principally by powerful hoisting machinery and three compartment vertical shafts. Incline shafts, which frequently indicate the uncertainty and irregularity of the veins and the fear that they may disappear in some uncertain direction, are unknown in Butte. The veins all have a regular and uniform dip. The country is not in the least precipitous or broken up, and a "fault" has never yet been discovered in the district. With a single horse and buggy a man can visit any mine in the district in the space of half an hour. Butte is the county seat of Silver Bow county, which has an assessed property valuation of \$6,000,000 and a low rate of taxation.

(CONTINUED ON PAGE 45.)

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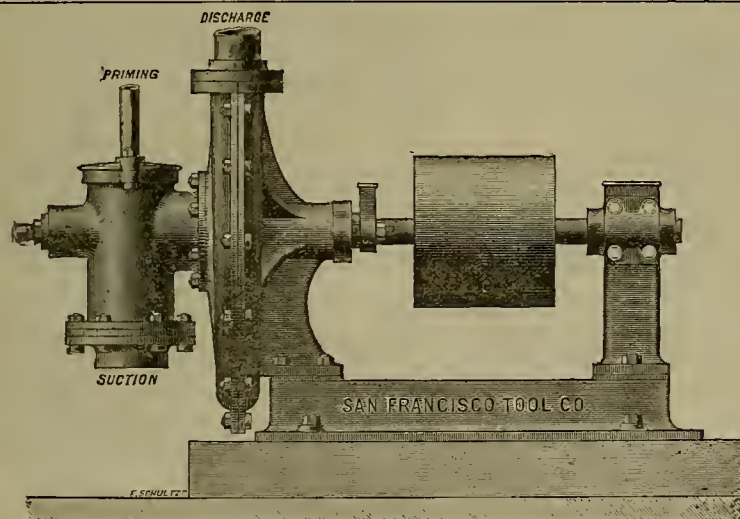
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SOFT AND PLIABLE, AND DOES NOT CUT THE ROD.

Does not Scatter or Dissolve, as does Asbestos, Plumbago or Soapstone
Packings, or Melt under Heat, as does Rubber.

Entirely Free from Grit or Hard Substances.

ESPECIALLY VALUABLE FOR PUMPS OF HIGH PRESSURE.

MANUFACTURED BY

W. T. Y. SCHENCK,

36 California Street, - - - San Francisco, Cal.

Mining in 1883.

(CONTINUED FROM PAGE 44.)

The population of Montana, of which Helena is the political and commercial center, is about 15,000. Since the time mines were first discovered there it has produced about \$180,000,000 in precious metals, chiefly gold. Placer as well as quartz gold mining is still pursued in many parts of the Territory. The total product last year was supposed to be by residents considerably larger than the mint director credited to the Territory.

The Alice Mill.

One with 20 and one with 60 stamps, has made a good year's work. The following shipments of bullion were made during the past year:

January	\$90,040.57
February	73,564.07
March	77,303.13
April	76,439.14
May	70,309.91
June	67,975.53
July	87,342.22
August	119,109.56
September	120,436.83
October	110,030.70
November	107,670.80
December (estimated)	120,480.55

Total.....\$1,277,000.00

The ore comes mainly from the Magna Charta, but recent explorations in the Alice have resulted in largely increasing the output of that property, and it now produces about one-third of the ore the company is treating.

The Lexington mine produced last year \$1,300,000 in bullion. The Silver Bow mill turned out \$25,000 to \$30,000 a month last year. The Colorado smelter is supposed to have turned out \$1,000,000 in silver-copper matte in 1883. The Anaconda coppermine has shipped about 1,800 tons of ore a month to Europe for reduction. The Salt Lake *Tribune* says that the number of stamps running are Alice, 80; New Lexington, 60; Old Lexington, 10; Moulton, 40; Silver Bow, 30, and Dexter, 15; making the total 236, on dry ores; Clipper 5, and Burlington 8, on wet ores; making a grand total of 249. In smelters there are the Montana Copper Company, 8 roasting and one blast furnace; Parrot, 5 reverberatory and 6 calciners; Colorado & Montana Co., 5 furnaces and 2 buildings, and Bell Co., 2 blast furnaces. The Lexington Company employ 142 men, the Alice, 275; Parrot, 100; Moulton, 60; Montana Co., 100; Colorado & Montana, 100; Silver Bow Co., 75, and W. A. Clark, on various mines, 100 men.

The Butte *Inter-Mountain* says that "the shipments of copper matte and ore from the district of Butte last year will approximate 70,000,000 pounds. There is no camp in the world that can make an equal showing. Leaving Leadville out of the calculation, there are no half dozen camps in the United States whose aggregate outgoing tonnage equals that of this district. The copper journals of the East magnanimously credited Butte with an estimated output this year of 18,000,000 pounds of copper." The Montana people surely have good cause for rejoicing over their results the last year. Among other things, Montana has developed a mild diamond excitement, some diamonds having been found near Helena.

COLORADO.

Colorado still stands in the foremost position among the bullion producing States and Territories, its product ranking all the others. The State has had the advantage of late years of more capital than other regions, and a large number of producing mines have been developed. It lies furthest from us on this coast, so the details of operations in its mines are not of so much interest to us as the general results achieved. In the table given in the first part of the article is given the bullion product, and the following tables of the output we take from the Denver *Tribune*, as giving in a condensed form the results of the year's work:

The mining products of Colorado for the year 1883—gold, silver, copper and lead were as follows:

County.	Amount.
Boulder.....	\$ 400,000.
Chaffee.....	300,000.
Custer.....	800,720.
Clear Creek.....	2,000,000.
Dolores.....	200,000.
Eagle.....	930,000.
Fremont.....	20,000.
Gilpin.....	2,208,980.
Grand.....	10,000.
Gunnison.....	650,000.
Hinsdale.....	300,000.
Lake.....	18,691,208.
La Plata.....	128,000.
Ouray.....	700,616.
Park.....	400,000.
Pitkin.....	125,000.
Rio Grande.....	182,000.
Routt.....	75,000.
Saguache.....	100,001.
San Miguel.....	225,000.
San Juan.....	418,955.
Summit.....	350,000.

Total.....\$36,306,131

Product of the Grant Smelting Works for 1883, was:

Counties & Territories.	Total lbs.	Total ozs.	Total ozs.
Lake.....	28,775,050	2,048,907	3,291.38
Clear Creek.....	91,170	10,274	308.16
Custer.....	27,733	20,089.57	628.25
Gilpin.....	19,120	113,733	3,570.00
Eagle.....	3,768,900	57,057	834.25
Summit.....	1,592,400	62,213	199.15
Gunnison.....	440,280	69,666	250.05
Boulder.....	9,720	4,716	1,227.00

Chaffee.....	179,240	19,086	148.95
Ouray.....	101,960	23,640	81.00
Park.....	228,740	36,792	680.95
Pitkin.....	284,930	24,963	52.65
San Juan.....	1,460,340	136,964	311.85
Saguache.....	3,800	1,192	.....
San Miguel.....	39,040	11,535	187,000.00
Col. Ore S. Co.....	258,470	125,238	426.50
Old Mexico.....	11,440	880	.....
New Mexico.....	11,330	5,221	.....
Miscellaneous.....	333,170	36,565	451.00
Arizona.....	201,090	255,918	74.45
California.....	18,800	24,624	470.00
Utah.....	1,689,500	75,155	168.06
Idaho Territory.....	134,160	16,158	.....

Total.....40,290,300 3,464,505 38,247.24

The above product, figured on the basis of lead at \$90 per ton, silver at \$1.10 per ounce and gold at \$20.68 per ounce, makes a total output of \$6,397,308, distributed as follows: Lead, \$1,813,065; silver, \$3,819,550; gold, \$764,693.

Shipments of the Boston & Colorado Smelting Company for the year 1883, were as follows:

LOCALITY.	GOLD.	SILVER.	COPPER.	TOTAL.
Gilpin Co.....	\$463,000	\$83,000	\$87,000	\$606,000
Clear Creek Co.....	44,000	640,000	41,000	725,000
Boulder Co.....	146,000	50,000	.....	206,000
Lake Co.....	.....	56,000	.....	56,000
Summit Co.....	.....	152,000	.....	152,000
Park Co.....	6,000	80,000	.....	86,000
Gunnison Co.....	3,000	13,000	.....	16,000
Utah Co.....	9,000	7,000	.....	16,000
Hinsdale Co.....	4,000	31,000	12,000	47,000
Saguache Co.....	.....	11,000	.....	11,000
San Juan Co.....	2,900	16,000	6,000	24,000
Ouray Co.....	.....	15,000	3,000	18,000
Chaffee Co.....	.....	11,000	.....	11,000
New Mexico.....	12,000	101,000	10,000	123,000
Arizona Co.....	.....	13,000	4,000	17,000
California.....	4,000	88,000	40,000	132,000
Montano Co.....	63,000	646,000	130,000	839,000
Miscellaneous.....	240,000	417,000	28,000	685,000

Totals.....\$909,000 \$2,576,000 \$362,000 \$3,007,000

This includes purchases from smelting companies, sampling works and ore buyers, and it is impossible to tell what district it came from.

The following is the statement of the Miners' Smelting Works at Golden, for the year 1883:

LOCALITY.	TONS.	GOLD.	SILVER.	COPPER.	TOTALS.
Clear Creek.....	2,900	\$ 8,355	\$158,735	\$ 4,265	\$171,355
Gilpin.....	2,950	88,000	16,740	11,718	117,183
Boulder.....	103	6,000	1,116	.....	7,116
Other sources.....	405	5,885	28,285	1,130	35,360
Tailings.....	2,338	16,326	2,140	.....	18,466

Totals.....6,796 \$125,201 \$207,016 \$17,113 \$349,420

BULLION SHIPPED.

Gold.....	\$193,330
Silver.....	277,181
Copper.....	35,100

The following statement gives the ores purchased and smelted and amounts paid for the same by the Royal Gorge Smelting Company, Canyon City, Fremont county, Colorado, during the last six months of 1883:

LOCALITY.	AMOUNT PAID.	TOTAL ASSAY VALUE.
Lake County.....	\$ 81,312.05	.....
Summit County.....	14,858.09	.....
Saguache County.....	1,920.10	.....
Chaffee County.....	3,454.96	.....
Custer County.....	1,795.40	.....
Gunnison County.....	1,196.87	.....
Pitkin County.....	887.01	.....
Denver Ore Sampling Co.....	24,132.17	.....
Utah.....	24,132.17	.....
Miscellaneous.....	2,454.62	.....

Total.....\$142,020.47 \$177,602.03

The following is a statement of value of ores purchased and sold by Matthews & Webb during the year 1883:

Counties	Silver	Gold	Lead	Copper	Totals
Chaffee.....	\$116,650.00	\$18,080.21	\$ 45.82	\$782,729.93	\$917,466.94
Ouray.....	288,385.63	13,450.82	66,589.75	45,388.82	454,810.22
Park.....	1,560.58	1,560.58	.....	.....	3,121.16
Pitkin.....	4,568.47	.....	1,000.75	.....	5,569.22
Summit.....	61,032.32	.....	119.70	.....	61,152.02
Boulder.....	1,076.43	1,291.54	6,409.45	6.10	8,783.52
Lake.....	88,229.81	2,570.01	37,002.13	105.40	125,807.35
Gilpin.....	3,500.79	5,144.06	1,106.56	608.08	9,759.49
Gunnison.....	1,076.43	.....	.....	.....	1,076.43
Utah.....	35,621.24	3,971.85	3,971.85	.....	43,565.94
Pitkin.....	45,121.04	9,712.83	6,280.78	.....	61,114.65
Denver Ore Sampling Co.....	31,710.18	4,274.55	991.75	.....	36,976.48
Utah.....	5,000.00	.....	.....	.....	5,000.00
Miscellaneous.....	5,480.04	.....	.....	.....	5,480.04

Mint Report.

The statement of the United States Mint at Denver, showing the business of 1883 and a comparison with that of 1882, is as follows:

	1882.	1883.
Number of deposits.....	747	2,010
Net value of deposits.....	\$501,329.64	\$1,370,166.30
Value of bars manufactured.....	504,790.03	1,371,634.61
Value of gold bullion sent to mint at Philadelphia for coinage.....	450,306.52	1,359,089.80
Value of gold bars refined and returned to depositors.....	24,428.51	12,595.01

ARIZONA.

If local authorities are to be credited, Arizona, in the matter of bullion production, has more than held her own the past year. According to the returns of Mr. Valentine, there has, however, been some falling off in the year's bullion output for this Territory, the decline, as compared with the preceding year, amounting to something over \$1,000,000. However this may be, there has, no doubt, much progress been made in the mining industry of the country, this shrinkage being due to a diminished production on the part of a few large companies, and not extending to the mines generally.

Besides the disadvantages of a hot and arid climate, a scarcity of timber, and a rather poor soil, Arizona has, first and last, suffered from a variety of extrinsic troubles, some of them of a serious kind. The hostility of the murderous Apache has, from the first, done much to discourage immigration, and otherwise retard the progress of the Territory. Before these savages were well out of the way the Texas Cowboys began to arrive in undesirable numbers. Following this disturbing element an army of tramps was left in the country on the completion of the railroads, this last addition swelling the turbulent and lawless population to an inconvenient and even dangerous degree. But as the regular army, assisted by the citizen soldiery, have succeeded in subjugating the Apaches, so have the public authorities, aided by the people, shown themselves able to cope with these unruly characters, the most of whom will be forced to betake themselves to honest labor or make an early exit from the Territory. Relieved from the presence of these unwelcome classes, Arizona will be likely to advance hereafter even more rapidly than she has done, her progress thus far denoting the extent of her mineral wealth, while it reflects creditably on the courage, perseverance and enterprise of her people.

The bullion product of this Territory amounts to about \$50,000,000, all told. Adopting the figures of Mr. Valentine, the product for 1883 amounted to \$8,183,743, as against \$9,298,276 in 1882. As a producer of copper, Arizona ranks 2, of silver, 4, and of gold, 10 among the States and Territories of the Union.

The Tucson *Star* has compiled with much care data concerning the mines of the Territory and their output for 1883. They place the bullion product one-third higher than Mr. Valentine's estimate, but we give the figures as follows:

COPPER CROP.	AMOUNT.
Arizona Copper Co., Clifton, lbs.....	8,106,575
Detroit Copper Co., Clifton.....	4,035,525
Copper Queen, Bisbee.....	7,950,000
Old Dominion, Globe.....	4,590,000
United Verde, Yavapai county.....	1,763,153
Omega, Pima county.....	350,000
Columbia, Pima county.....	273,000
Long Island, Globe, estimated.....	475,000
Tacoma, Globe, estimated.....	400,000
Buffalo, Globe, estimated.....	250,000
Cochise Copper Co., no report.....	.....

Total, lbs.....28,108,253

There has been a large amount of copper ore shipped out of the Territory of which we give no estimate; also scattering shipments of copper bullion. This includes the Cochise Copper Company, which has been running two furnaces part of the year. All told, it will probably reach 1,000,000 pounds, making the total aggregate nearly 30,000,000 pounds. The *Star* estimates the product of 1884 at not less than 50,000,000 pounds.

SILVER AND GOLD.

Silver King, concentration.....	1,041,462
Benson smelter.....	723,122
Arizona Central, gold.....	265,000
United Verde.....	130,000
Pinal, consolidated.....	207,771
Tip-top.....	37,569
Silver District, silver.....	83,925
Silver District, gold.....	173,552
Hewell smelter.....	25,300
Stonewall.....	42,000
Golden Rule, estimated.....	125,000
Pima county.....	281,175
Mohave county, estimated.....	150,000
Pinal county, estimated.....	175,000
Gila county, estimated.....	250,000

Total.....3,711,445

TOMBSTONE.

Contention.....	905,635
Grand Central.....	868,928
T. M. & M. Co.....	702,900
Boston Custom.....	226,500
Knoxville Stowell.....	125,000
Head Center.....	53,532

Total.....2,881,904

RECAPITULATION.

Tombstone.....	2,881,904
Outside districts.....	3,711,445
Estimated output not reported.....	1,500,000
Value of copper bullion.....	4,228,987

Grand total.....\$12,322,336

Since the advent of the railroad the natural resources of the Territory have been greatly developed. The Narrow Gauge railroad from Tucson to Globe is now under course of construction, which, when completed, will open up one of the most wonderful mineral fields in the Southwest. It will tap the coal-fields of Deer Creek, the timber lands of the Pinal range, and be the means of furnishing cheap and quick transportation for fuel, ore and merchandise, which will put into operation hundreds of mines of copper, silver and gold which are now idle for want of cheap fuel. The A.

M. B. road from Globe to the A. & P. is now looked upon as a fixed fact, and its construction will go forward during the year. Also the road from Prescott to the A. & P., which will in all probability be under way in a short time.

Oro Blanco District.

EDITORS PRESS:—Oro Blanco is in the southwestern part of Arizona, and forms the boundary of Sonora, Mexico. The latest strike and the richest ore in this neighborhood was in the Franco-American, owned by Gen. G. W. Deitzler, of San Francisco. At 50 feet he drifted seven feet through solid ore and struck white quartz. He is now drifting in an opposite direction and is still in good pay ore, averaging 33 per cent. copper and \$200 per ton in silver, and apparently an inexhaustible mine. The Warsaw Mill shut down a few days ago for want of water. The last run was a very profitable one, particularly on ore from the Cross lode and the Montana mine. Esperanza Mill, Mr. Blaisdell superintendent, would have started up before this, it is supposed, had they not lost their drill-bit in the well while boring for artesian water. He is now putting up a steam power and laying pipe to the Calaveras mining shaft, where he expects to find an abundant supply of water. Messrs. Clarke and Dixon have a fine body of ore in their mine at the Sierra Colorado. It carries from \$600 to \$900 per ton, gold and silver. I could mention other fine prospects, but, for the present, adios.

Oro Blanco, Jan. 3. HAMPTON WEED.

Development in Mojave Country.

EDITORS PRESS:—I send herewith a statement of the progress of mining development in this district and county as requested in the last issue of the MINING AND SCIENTIFIC PRESS. I give a simple statement of the facts in regard to the progress of mining here, without any exaggeration.

Since the advent of the A. & P. R. R. at Kingman, the nearest station to the mining camps of Walapai district, mining has received an impetus which it never knew before. Formerly only ores of a very high grade could be worked or shipped with profit. Now, however, low grade ores are almost as valuable as high grade ores were formerly. Fifty ounces of ore is now worth as much as 100 ounces of ore was two years ago. Miners are steadily beginning to realize this fact, and now almost every miner in Walapai district is taking out ore for shipment, either to San Francisco, Benson or Colorado. The first car load of ore shipped by a miner after the railroad reached Kingman was taken out at Chloride and went to the smelting works at Albuquerque. The very satisfactory results obtained from the working of this car load induced others to ship to the same smelter. It was immediately followed by three car loads of ore from Stockton, one from Cerbat, two from Chloride and one from Todd Basin, all of which, owing to the failure of the Albuquerque smelter, were forwarded to Pueblo, Colo.

The demand for lead ores in the San Francisco market stimulated the extraction and shipment to that market of lead ores of which there is an unlimited reserve in Walapai and district. The New London mine, at Cerbat, has shipped three cars of lead ore within the past three months, and is now producing twenty-four ounce galena at the rate of three or four tons per day, the result of three men's labor. The Champion mine, at Cerbat, has shipped six cars of galena ore carrying from 23 to 27 ounces silver, and from 50 to 64 per cent lead, and is at present producing four tons daily, working seven men.

Salisbury & Co., of the Benson Smelting Works, having purchased the Schuykill mine at Chloride, are now working eleven men and extracting six tons of heavy lead ore daily. The galena shows for over 2,000 feet along this ledge, on the Schuykill and adjoining claim, and is from 6 inches to 3 feet in width, carrying from 17 to 24 ounces silver per ton. The ore from the Schuykill is being shipped to Benson, Arizona. The adjoining claim is being worked on a very small scale by one man, and produces about two tons daily. There are several other mines in the vicinity of Chloride which are capable of producing from one to five tons of galena per day to the man, but owing to lack of enterprise are not being worked at all, or else working on a very small scale. There are many other claims near this camp which are producing high-grade ores—from \$80 to \$350 per ton. At present the shipment of ores from Chloride is larger than from any other camp in the district, and the outlook promises a steady increase in prosperity. The company work is being steadily pushed on the Cupel at Stockton, but with little success so far. (Since writing the above an 8-inch streak of ruby silver ore has been struck in the Cupel, assaying \$300,000 per ton.)

In doing the assessment on the Lone Star, near Mineral Park, in December, about three tons of \$350 ore were extracted on the 100-foot level. This mine had been shut down for nearly two years, but has now started up again with prospects for a steady run.

The American Flag mine, in Maynard district, is shipping some high-grade ore. The ore from this mine, together with all batches of ore less than a carload from Walapai and Maynard districts, is bought by the Arizona Sampling Works, at Kingman, and shipped to the Argo Smelting Works. Work is now being prosecuted in the crosscut, which is paying well.

The Hackberry mine is working a good force than usual, and preparations are being

(CONTINUED ON PAGE 22.)

D. B. HINCKLEY.

J. SPIERS.

D. E. HAYES.

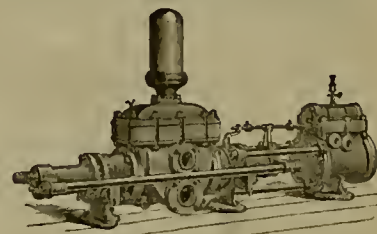
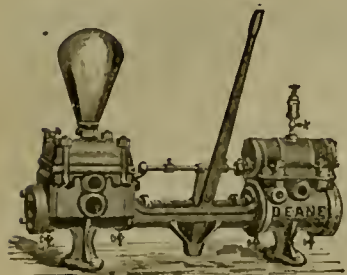
FULTON IRON WORKS, HINCKLEY, SPIERS & HAYES.

(Established in 1855.)

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OFFICE---No. 220 FREMONT ST.,

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HOISTING WORKS—WHIMS FOR PROSPECTING SMALL MINES; PORTABLE HOISTING ENGINES AND BOILERS, WITH REELS suitable for wire or hemp rope, of new designs, embodying all the latest improvements.

MINING MACHINERY—Hoisting Cages, with safety attachments; Safety Hooks, Ore Cars, Ore Buckets, Water Buckets, Car Wheels and Axles, Ore Gates with racks and pinions for Ore Bins, Pumping Machinery, Air Compressors, Air or Water-pipe Receivers, etc., etc.

MILLING MACHINERY—Gold Mills, with Pans or Concentrators, as required; Silver Mills, either for dry or wet Crushing, with Roasting and Drying Furnaces, Pans, Settlers, etc., as required; Smelting Furnaces for either Lead, Copper, Silver or Gold; Willard's Roasting Furnaces, especially adapted for gold ores; Retorts, Bullion Molds, Ore Feeders, Rock Breakers, etc.

MISCELLANEOUS MACHINERY—Sawmills, Flour Mills, Oil Well Machinery, Water-wheels and Castings.

ENGINES AND BOILERS for any and all purposes, adapted to economical use of fuel.

CORLISS ENGINES A SPECIALTY. PRICES MODERATE.

AMONG OTHERS THE FOLLOWING MILLS HAVE BEEN BUILT BY US:

Tombstone Mill, 15 stamps.....for the Tombstone Mining Company.	Sunset Mill, 10 stamps.....for the Head Center Mining Company.
Corbin Mill, 25 stamps.....for the Corbin Mining Company.	Grand Central Mill, 30 stamps.....for the Grand Central Mining Company.
Contention Mill, 25 stamps.....for the Western Mining Company.	Stonewall Jackson Mill, 10 stamps.....for the McMillan Mining Company.

AGENTS FOR THE PACIFIC COAST FOR THE DEANE STEAM PUMP.

SEND FOR ILLUSTRATED CATALOGUE AND PRICE LIST.

THE CONSUMERS' COMPANY.



VULCAN B B and AJAX

The BEST LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

VULCAN NOS. 1, 2 AND 3,

THE BEST NITRO-GLYCERINE POWDERS MANUFACTURED.

Having secured large lots of the best imported Glycerine at low prices, we are prepared to offer the mining public the very Strongest, Most Uniform and Best Nitro-Glycerine Powder at the very LOWEST RATES.

SPECIAL INDUCEMENTS IN PRICES.

AJAX AND VULCAN B B POWDERS ARE UNEQUALED FOR
BANK BLASTING AND RAILROAD WORK.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER COMPANY,

No. 218 California Street,

San Francisco, Cal.

Mining in 1883.

(CONTINUED FROM PAGE 48.)

made to erect a forty-ton water-jacket at that place. Upon the whole the mining outlook in the Mohave is better than ever before, and while there is no excitement, there is what is still better, a gradual but steady increase in mining enterprises, with every indication that every advancement made will be permanent. From the most accurate information I can secure, the Arizona Sampling Works have shipped about 500 tons of ore to Colorado.

HENRY P. EWING.

Mineral Park, A. T., Jan. 2, 1884.

The *Republican* concludes its review of Tombstone district by recapitulating the amounts of ore and silver produced by the various mines of the district. Most of the figures given below are authentic, derived from the books of the company. The production of the Grand Central and Contention mines for the last five months we had to estimate. In this, as in all other cases where we were compelled to estimate the production, we have taken the lowest figure, so as to be sure and not overestimate the production. Also, many small lots of ore have escaped our notice, the shipments of them never having been recorded. On account of these reasons, the actual production far exceeds this estimate:

CONTENTION.	Tons.	Value.
First five months in 1883.....	13,652	\$553,085 95
July and August.....	2,455	\$4,869 64
Last five months.....	19,060	\$50,000 00
Total.....	35,167	\$987,955 59

GRAND CENTRAL.	Tons.	Value.
Ore produced.....	29,250	\$854,522 00

TOMBSTONE MILL AND MINING COMPANY.	Tons.	Value.
Ore produced.....	16,322	\$611,084 00
Silver bullion.....		\$0,313 00
Gold in bullion.....		\$0,935 00
Lead in bullion.....		\$0,935 00
Total gross production.....		\$702,338 00

LUCK SURE.	Tons.	Value.
Ore produced.....	630	\$35,977 29

RATTLESAKE COMPANY.	Tons.	Value.
Ore produced.....	1,980	\$98,000 00

BOSTON AND ARIZONA S. & R. COMPANY.	Tons.	Value.
Knockville ore produced.....	2,250	
Custom ore.....	1,330	
Total.....	3,580	\$226,500

WORONOCO G. & S. M. COMPANY.	Tons.	Value.
San Diego ore output.....	95	\$4,250 00
Custom ores.....	320	7,625 00
Total.....	415	\$11,875 00

WAY UP.	Tons.	Value.
Ore produced.....	550	\$6,250 00

INGERSOLL.	Tons.	Value.
Ore produced (approximated).....	950	\$28,500 00

VARIOUS OTHER MINES.	Tons.	Value.
Ore produced.....	1,200	\$54,000 00

TOTAL PRODUCTION.	Tons.	Value.
Ore produced, 1883.....	81,034	\$3,020,912 88

COPPER QUEEN.	Tons Ore.	Value.
Jan. 1 to Nov. 30, 1883.....	31,323	
Estimate for December, 1883.....	2,300	
Total.....	34,123	

Jan. 1 to Nov. 30, 1883.....	31,323
Estimate for December, 1883.....	2,800
Total.....	<hr/> 34,123

Total value.....	Value.
Dividends during 1883.....	\$1,136,369 27
	\$500,000 00

Total.....	Value.
	\$3,926

Total value.....	Value.
	\$1,136,369 27
Dividends during 1883.....	\$500,000 00

Of Yavapai county, the Prescott *Courier* makes the following estimate:

United Verde.....	\$900,000
Howell Co.....	400,000
Black Warrior.....	100,000
Silver Belt.....	200,000
Tiptop & neighboring mines.....	75,000
Dosoris.....	250,000
Pine Spring & sister mines.....	75,000
Blue Dick.....	20,000
Bigelow's.....	5,000
Tuscania.....	20,000
Groom Creek.....	10,000
Other mines.....	10,000
Total.....	\$1,385,000

The foregoing estimate takes in the value of bullion product at home, of placer gold and of lots of rich ores which were shipped to Pueblo, Colorado and Benson, Arizona, for treatment.

We give these figures and estimates with their source without pretending to vouch for their accuracy, but it is impossible to get exact data on the subject.

The purchase of the Quijotoa mines by the well known bonanza firm of this city has caused considerable excitement in Arizona. Four companies have been formed—the Peer, Peerless, Combination and Weldon—each with a capital stock of \$10,000,000. Comstock miners have been sent down to take charge of the mines. There has been a great rush to the district, and other mines are reported found in the neighborhood.

The *Star* says further: The bonanzas have not yet been all discovered in Arizona. When the Silver King was first opened, it was said "nature had put the whole mineral business of Arizona in that spot." When the Clifton copper mines were discovered, it was believed they were the only copper mines in Arizona worth developing. But in silver we shortly discovered Tombstone, which has turned out its millions. In copper we have our Bisbee, the Globe country, and other sections that are producing millions of pounds annually, and still new discoveries are being made of the bronze metal. Now comes the discovery of the Quijotoa, and the rush to that camp is all the rage. No doubt but it will yield its millions. But there are still other Silver Kings, other

Tombstones and other Quijotoas in Arizona undiscovered. The prospecting business of the Territory has but fairly begun. The production of the bullion is just commencing.

Tombstone is yet the principal bullion-producing camp, and the year just passed has been replete with much importance to that camp and surrounding district. The *Republican* of that place says:

No one can deny that to-day there are many more mining claims in course of development than ever before, while as a place of business and an important mining center for the many surrounding districts, as well as the daily increasing demands of Northern Sonora, make this the mining headquarters of the Territory. For the information of distant readers it may be stated that the mining district of Tombstone is daily enlarging its boundaries, and we are within the mark when it is stated that the known deposits of ore extend from the town to within a couple of miles of Charleston in a direct northerly and southerly direction about eight miles and whose breadth varies from two to four miles. Hardly a week passes but some new find or discovery is made, and we now chronicle one that is second to none in importance. The increasing extent of copper deposits found both in this, the southeasterly part of Arizona, as well as in the northerly part of Sonora, especially in the Canansa and Manzanil mountains, is worthy of record, as when these districts are thoroughly explored they will be able, without doubt, to hold their head up with the lake Superior regions.

NEW MEXICO.

This Territory is the oldest mining section of the country, but even in the old days of Spanish possession the Indians drove away the miners. It is only of late the country has been safe for prospectors. The advent of the railroads has changed matters so that themines are now being opened. The principal discoveries have been in the southern part of the Territory—in the Black range and thereabouts. In the northern and central counties many rich and extensive deposits exist, but mining is retarded by the existence of land grants. The Mint Director figures up the production of 1882 as follows:

Bernalillo County.....	\$5,000
Colfax.....	20,000
Dona Ana.....	920,000
Grant.....	460,000
Lincoln.....	55,000
Santa Fe.....	40,000
Socorro.....	440,000
Total.....	\$1,950,000

Of this only \$150,000 was gold, the balance being silver. No estimate of production by county is at hand for 1883, but Wells, Fargo & Co., put the total figures for 1883 at \$3,413,519, of which only \$173,000 was gold; of ores and base bullion they count up \$2,048,000. No doubt that the mines will continue to increase their products from this on.

It cannot be said that New Mexico has made a brilliant record the past year, notwithstanding the reported richness of many of her mines. They do not seem to have come down to a good business basis as yet, and there is too much of the "boom" and speculative fever for the good of the mines themselves. The evil results are apparent in a sort of distrust of the New Mexican mines. Some very good claims will have to make good records of bullion production to again inspire the confidence in the regions, without which its mining industry will not flourish. In the past there have been serious obstacles to the introduction of sufficient capital. Until the railroads were built the Territory was practically inaccessible. There were but few inducements for prospectors, and less for miners or mining companies, because they had to be exceptionally rich mines to bear the cost of working and the transportation of supplies and products. The opening of the railways changed this. Prospectors came in; they located the country and made known to some extent its vast resources in the various minerals. But, unfortunately, another class came—mine operators, mining sharks, professional schemers—ready to trade upon the popular curiosity, to take advantage of the popular ignorance.

OREGON.

Viewed in the light of developments made, only in a limited sense can Oregon be considered a mining country, her standing in this respect among the States and Territories of the Union being as follows: Gold 7, silver 9, coal 17, iron and steel 27. But, while so comparatively little has been done in the way of turning this class of her resources to practical account, Oregon is by no means deficient in mineral wealth, the great agricultural and grazing advantages of the State having tempted labor and capital to embark in farming and stock raising, to the neglect of mining pursuits. The remote situation of the mines here, the principal districts being far inland and difficult to reach, has further tended to check mining operations in this State. The principal mineral resources of Oregon, so far as ascertained, consist of gold, silver, iron, coal, copper, lead, nickel, antimony, etc. Of these only the four first named have as yet been much utilized. Salt, soda and cinnabar are among the mineral products of the State—deposits of the latter,

found in Douglas county, having lately been worked in a small way.

The total bullion product of Oregon, including that of 1883—\$600,000—amounts to about \$62,000,000. Of this, some \$40,000, taken out during the past six years, consists of silver. The smallness of the product of 1883 was owing to lack of water for working the hydraulic mines and gulches, from which more than two-thirds of the Oregon gold is obtained. The auriferous deposits of Oregon occur in much the same manner as those of California, and are worked by all the various methods and appliances in use in this State. The number of men engaged in gold mining in Oregon amounts to about 4,000, of whom more than one-half are Chinese.

It has always been more or less difficult to obtain reliable information as to the amount of gold and silver annually produced in Oregon, because so much of the mining is done by Chinese, who are reticent as to their operations, and much of the dust is carried away by private individuals and no record kept. The production of 1882 was less than 1881, if we can take as a basis the fact that the gold reported as received at the mint was \$140,000 less than the previous year. That left the product for 1882 as \$865,000, divided as follows: Baker county, \$195,000; Benton county, \$5,000; Coos county, \$5,000; Curry county, \$20,200; Grant county, \$265,000; Jackson county, \$137,000; Josephine county, \$177,000; Union county, \$60,800. Last year, as stated above, the yield was still less. In Baker county placer mining has been one of the principal industries for the past twenty years, and still gives employment to a large percentage of the population. It is, however, being gradually turned over to Chinese, who pay good prices for ground already worked over by white men, as they live so cheaply and are satisfied with small returns. Baker city is about the center of the mining section, nearly all the mines of the county being within a radius of forty miles of that place.

Grant county is in eastern Oregon. The old mines found on Canon, Dixie, Elk and Granite creeks as far back as 1862 are yet worked, but principally by Chinese, who are working claims abandoned by white men. The principal quartz mines are in the northern part of the county, on the range of mountains between the middle and north forks of the John Day river, including Elk and Granite creek districts. The quartz mines are worked and owned by white men.

As a general rule, the quartz milled in Oregon is of a higher grade than that worked in California, the mass of it yielding from fifteen to twenty dollars per ton. But it costs more to work it here, by reason of the long wagon transportation required to get machinery and supplies into the mines, the most of which are located far distant from both railroad and water communication.

There are now about thirty quartz mills in this State, besides a few arrastras. The former carry an average eight stamp each, and are nearly all run by steam power. As none of these mills have been provided with means for concentrating and working the sulphureted ores, a good deal of gold is lost. Millmen have as yet aimed to save only free gold.

Quartz Mining.

While there is something being done in this line of business in nearly all the mining counties of Oregon, the most extensive operations are being carried on in Union, Grant and Baker counties, in the northeastern part of the State. The more active quartz centers here consist of the Eagle creek, Elk, Olive, Granite creek, Baker city, Burnt river, Union and Rye valley districts; all of which contain numerous gold bearing lodes of good promise, many of which have been partially and some very thoroughly opened up. In the Ochoco district, Wasco county, several companies have been operating in quartz during the past year, with encouraging prospects, making, according to report, a good showing of both gold and silver.

While most of the auriferous ores of Oregon carry the gold in a free state, some of them are vitiated by the presence of antimony and other base substances that prevent the gold amalgamating with mercury. In many instances the gold is alloyed with a small percentage of silver, some of it carrying quite a large amount of that metal. The bullion turned out by the mills in the Rye valley district is worth only about \$12 per ounce; that made in some localities being worth not over five or six dollars per ounce, owing to the presence of so much silver. Occasionally the gold dust obtained from the placers is found alloyed in like manner, being worth only \$9 or \$10 per ounce.

Hydraulic Mining.

As with the quartz, so are the heavier hydraulic operations in Oregon confined to the northeastern group of mining counties, the gravel deposits in the southwestern and western portions of the State being generally shallow, while water there in large supply is not easily obtained. In the northeastern counties the gravel deposits range from 20 to 60 feet in depth. The most of them are free alike from superincumbent and imbedded barren matter, the mass of the material paying throughout. While these deposits have thin blue gravel and rich channels, the Pliocene or "Dead Rivers" proper, such as are found in California, do not occur here, yet, paying so uniformly, being free from sterile layers of pipe clay and sand, and capable of being washed with comparatively

little water, these gravel banks can always be worked with more or less profit.

For introducing water into these hydraulic and other diggings a large number of ditches have been constructed. The most of these works are, however, short and of limited capacity, ranging from three to five or six miles in length, and carrying from two hundred to five hundred inches of water each. There are perhaps thirty ditches in the State, ranging from ten to sixty miles in length, and in carrying capacity from 500 to 2,500 miner's inches each. These ditches depend for the most part on the melting of the snow on the mountains, where they head, for their supply of water. Not being very lofty, the snowfall on these mountains is comparatively light, and melting early in the summer leaves the ditches dry, or nearly so. This makes a short water, and consequently a short working season for the hydraulic miner, its average length being hardly more than three months. Hence his enforced idleness for the most of the year, and a greatly restricted production of bullion.

WASHINGTON TERRITORY.

While there are some promising deposits of the precious metals in this Territory, its principal mineral wealth consists of iron and coal, both of which are found here in great abundance and of good quality. Both gold and silver-bearing lodes have been met with in different parts of the Territory. Very little work has, however, been done upon them, and whether or not they are sufficiently rich to warrant a further expenditure of money upon them, remains to be seen. The placers of Washington have from time to time attracted some notice, but none yet discovered have amounted to much. There was a great excitement a few years since about gold mines on the upper waters of the Skagit river, and a good many men suffered much hardship forcing their way to these diggings during the winter, as numbers are now doing into the Cœur d'Alene country, only to meet with sore disappointment in the end, the mines turning out to be poor and of limited extent. All the gold obtained from this Skagit country has amounted to only a few thousand dollars per year, the small number of men who have since worked the mines there having barely made day wages for a portion of the year, it being impossible to continue operations there during the winter. The total bullion product of Washington Territory, nearly all gold, amounts to scarcely more than a million dollars. Jno. J. Valentine, in his statement of the precious metals produced on this coast, credits it with a production of \$63,526 for the year 1883, of which \$351 was silver.

The principal coal fields of this Territory extend at intervals along the easterly side of Puget sound for a distance of more than a hundred miles, the three chief points of shipment being Seattle, New Tacoma and Bellingham Bay, shipments from the latter having been small for a number of years past. During the thirty years that coal mining has been carried on here over two and a half million tons of coal have been exported from the country, the most of it during the past few years. The Newcastle mines, which ship from Seattle, are the largest producers. The quantity of coal sent from that place since 1871, when the mines tributary thereto were first opened, amounts to 1,200,000 tons. The product of the Wilkeson and the Carbonado mines, already large and rapidly increasing, seeks outlet through New Tacoma, where coal bunkers of immense capacity have been erected. While the coal industry of this Territory is so undergoing enlargement every year, renewed attention is likely to be paid to the manufacture of iron there, as the large demand for this metal will, it is expected, lead to a resumption of operations at the works erected near Port Townsend several years ago, but which of late have been idle. At the end of this review, under the subject of coal, the product of the mines is given.

ALASKA.

We find the gold-seeker here engaged in the irrepressible conflict, battling manfully, as he always does. But, here in Alaska, under many disadvantages yet with encouraging prospects, only on Douglas Island and on the mainland opposite in the vicinity of Harrisburg, have quartz lodes of much promise yet been discovered; and this, probably, because very little prospecting has elsewhere been done. The principal quartz vein on Douglas island is represented to have an average width of 125 feet—all pay ore, that will mill \$8 per ton, free gold. A five stamp mill put up near the lode has been running quite steadily during the past year. Another five stamp mill, erected on a quartz vein near Harrisburg, though completed has not yet commenced running. The ore here is also of good grade, and as there is plenty of it this enterprise will be likely to prove a success. Several arrastras have been running on it for some time past with excellent results. From all accounts there is enough ore in these two localities to give long continued and profitable employment to a large number of stamps.

The quartz lode on Douglas island being much decomposed on the surface has been

(CONTINUED ON PAGE 50.)

W. H. TAYLOR, President.

JOSEPH MOORE, Superintendent.

THE RISDON IRON AND LOCOMOTIVE WORKS,

S. E. Corner Beale and Howard Streets, San Francisco, Cal.,

MANUFACTURERS OF.....

STEAM SHIPS, MARINE ENGINES,
MARINE BOILERS, SCREW PROPELLERS,
CENTRIFUGAL PUMPS, STEAMSHIP PUMPS,
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STEAM CAPSTANS, CARGO WINCHES,
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HYDRAULIC MACHINERY, PUMPING MACHINERY,
COMPOUND ENGINES, CORLISS ENGINES,
POPPET VALVE ENGINES, SIDE VALVE ENGINES,
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Prompt Attention Given to All Kinds of Repair Work.

ALSO HAVE SPECIAL FACILITIES FOR THE MANUFACTURE OF ALL KINDS OF

SHEET IRON AND PLATE IRON PIPE,

Having Made Most of the Principal Pipe Lines on the Pacific Coast.

AMONG THE WATER COMPANIES NOW USING THEIR PIPE ARE:

Spring Valley Water Works, San Francisco, over 20 miles, varying in diameter from 22 inches to 30 inches.

The Cherokee Flat Mining Company, over 12,000 feet of 30-inch pipe, a portion of which sustains a pressure of 380 pounds per square inch.

The Virginia and Gold Hill Water Company's pipe line, a portion of which sustains a pressure of 750 pounds per square inch.

Portland Water Company, Portland, Oregon, several miles of 30-inch pipe.

The Hawaiian Commercial Company, several miles of 30-inch pipe on the Island of Maui.

Also several miles lately constructed for Messrs. W. S. Hobart and A. Hayward for the Plymouth Consolidated Mining Company, and numerous other places where smaller quantities are in use.

PRICES FURNISHED ON APPLICATION.

VICORIT POWDER.

NO ACCIDENT HAS EVER HAPPENED!

ALL POWDERS manufactured by the California Vigorit Powder Company are SUBMITTED, during the course of manufacture, TO SCIENTIFIC and accurate TESTS for safety and strength. They are Tested for Safety against Friction, Fire, a Temperature of 212 degrees Fahr., and the various shocks to which Powder is Liable in Practical Handling.

The following qualities are common to all grades of Powder manufactured by the Company:

SAFETY, NON-LEAKAGE, FREEDOM FROM NOXIOUS GASES, UNIFORMITY AND STRENGTH.

If consumers desire it, the EXACT STRENGTH of any Powder shipped to them will be GIVEN IN FOOT POUNDS. Send for Pamphlet showing methods of testing the different qualities of all powders. The Company manufactures

DETONITE.

This is an explosive involving new principles and recently patented. It is the Strongest Powder ever placed on the Market, in this country or abroad. It is the Safest Strong Powder ever made. For very refractory rock this Powder is the most economical in the market.

VIGORIT, No. 1, XX.

This Powder is Stronger than the Highest Grades of Hercules or Giant. It is only surpassed by "Detonite." It is suitable for hard rock.

VIGORIT, No. 1.

For general work this Powder has no superior. It has the advantage over Giant, Hercules or Vulcan in safety and freedom from noxious fumes.

VIGORIT, No. 2.

Equal to any corresponding grade in the market.

LOW POWDER.—Vigorit, L. P.

This is a Powder suitable for Bank Blasting, Log Splitting, or the work generally in which Black Powder can be used. It is Stronger than Black Powder, having from twice to ten times the effective strength, depending on resistance. It is Superior to Judson Powder, in being more sensitive to the cap and more convenient in handling.

Best qualities SINGLE, DOUBLE and TRIPLE TAPE FUSE; also agents for X, XX, XXX, XXXX, and XXXXX BLASTING CAPS, at Lowest Prices in the market, and quality guaranteed.

ENGLISH, WRIGHT & LUKENS, General Agents,

CALIFORNIA VIGORIT POWDER COMPANY,, 327 PINE STREET,
SAN FRANCISCO, CAL.

ED. G. LUKENS.

G. B. WRIGHT.

W. D. ENGLISH.

Mining in 1883.

(CONTINUED FROM PAGE 48.)

worked for several years past by placer methods. Some diggings, in a sort of basin, three miles above Harrisburg have also been worked by hydraulic washing and paid well.

Elsewhere in Alaska no largely paying placers have yet been discovered, though some gold has been met with on the bars along the Yukon river for a distance of several hundred miles, and it is thought that with more extended and careful prospecting paying bars will be found along that stream. The chances are that it will be more thoroughly explored the coming summer than ever before.

A long way to the northwest on Fish river, a heavy body of argentiferous galena was discovered two or three years since by parties resident of Oakland, who at once took measures for getting out the ore and shipping it to this city. The wrecking unfortunately of a schooner loaded with supplies in Golovin bay, near the mouth of Fish river, has prevented the company getting much of this ore to market. Next year they expect to send down a good deal of it, as it can be easily mined and they have a steamer for bringing it down to the mouth of the river, which can be approached by large vessels. The vein at this place is reported to be 40 feet thick, composed mainly of ore carrying \$150 in silver and \$10 gold, to the ton, with 60 per cent lead.

The hullion production of Alaska is officially given at \$15,000 for 1881, and \$150,000 for 1882, the product for 1883 having been about the same, or probably a little more than that of 1882. The present year will, it is thought, bring some increase.

Beds of superior coal, by some pronounced anthracite, exist on Admiralty island, close to deep water. Along Copper river deposits of rich cupriferos ore have been found; also considerable masses of metallic copper. Beds of marble equal to the best Italian stand so close to the deep inlets that the stone can, by means of gangways of no great length, be placed on shipboard, these beds being so extensive that blocks of any desired size can easily be broken out.

Except the few discoveries made immediately on the coast hardly anything is known as yet in regard to the mineral resources of Alaska, the heavy timber and the mountainous character of the country, coupled with the deep snows in winter and the frequent heavy rains at other seasons of the year, having prevented, as they always will greatly interfere with explorations being carried on in the interior. That the mineral wealth of the country will ultimately prove to be considerable may be inferred from what the limited researches already made have brought to light, this being apart from its fur trade, fisheries, lumber, and possibly other resources of large commercial value. What of mineral riches may be contained in the gloomy realm that stretches away to the Arctic ocean is yet to be ascertained. The fact of some gold having been found along one of the great rivers that traverses this region will be sure to carry the veteran prospector into it at an early day, the hope of striking placer diggings operating on the imaginations of this class of men after the manner of the electrical current, the nearer the North Pole the stronger the attraction, and if that mythical pivot is ever reached it will be not first by Arctic explorers, but by the California gold hunter.

BRITISH COLUMBIA.

While the population and general business of this Province have been much increased during the past year, there has been no increment of bullion, nor are any important mineral discoveries announced for the year. Even the usual output of coal, the most staple mineral product of the country, has, by reason of labor troubles, been somewhat diminished. The total bullion yield of British Columbia, consisting wholly of gold, amounts to about \$20,000,000, the product of 1883—some \$700,000—being included in this sum. Although the value of the gold taken out here has been steadily declining for nearly ten years past, it is probable that the production of this metal will undergo some increment hereafter, the output of coal being quite sure to do so. The Province is beginning to feel the vivifying effects of the Canada Pacific railroad approaching it from the east, and the western portion of which is now in course of rapid construction within its borders.

Besides the Cariboo district, whence most of the gold produced in British Columbia has been taken, there are other placer mines in the country, some of them probably quite extensive. Some little gold is still being gathered on the bars of Fraser river and its tributaries, and pay diggings are reported to have been lately found on Deloivre river, a branch of the Mackenzie, at a point about 250 miles from Dease lake. Bars that will pay small wages have also been found on Chum creek, and at several other places in the Province.

The placers of the Kootenay country, worked extensively many years ago, are far from being exhausted; it being the opinion of those best acquainted with this region that the diggings there have been merely skimmed of their surface gold; and that the more prominent deposits remain untouched. During the earlier stages of their history, these mines were worked under many disadvantages, the Indians being at times troublesome, and the cost of getting in supplies great. But all this has been or

is likely soon to be changed, the Northern Pacific railroad, already finished, passing within a hundred miles of this country, while the Canada Pacific, which will be completed within another two years or less, approaches it still nearer. Through the construction of a lateral railroad this Kootenay country could be connected with the Canada Pacific road, and thus be made tributary to the latter to its very great benefit. A plan for the construction of such lateral road, in connection with the navigation of some waters in that region, has been projected, and will very likely be carried out, as the interests of the Province and the Canada Pacific Company require that the trade of this district be secured to them instead of being diverted to the Northern Pacific road, as much of it otherwise might be. This Kootenay country, by reason of the large amount of good farming and grazing lands and the mineral wealth it contains, is by far the most valuable section of British Columbia, its proximity to two great overland thoroughfares, whereby its early settlement is assured, adding greatly to its prospective importance. Large veins of silver and copper bearing ores, many of them of high grade, are reported among recent discoveries in this section of country, also deposits of argentiferous galena of great magnitude, this ore, though low in silver, running high in lead. That this region is traversed by a rich and extensive mineral range admits of no doubt; its agricultural resources being also considerable. With improved means of access and cheapened transportation, it may well be supposed that modern enterprise, quickened by competition, will hasten the settlement of this country and lead to its many forms of natural wealth being turned to practical account.

Notices of Recent Patents.

Among the patents recently obtained through DEWEY & CO.'S SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

MACHINE FOR HOOPING BARRELS.—Thos. C. Duff and Roht. I. Allan, S. F. No. 291,583. Dated Jan. 8, 1884. This invention relates to a machine by which hoops may be forced upon barrels or casks; and it consists of a series of adjustable rollers attached to a driving mechanism by which they may be caused to travel around upon the edges of the hoop (the cask standing vertically beneath for the purpose), and, in combination therewith, of a means by which the rollers are carried downward as they revolve until the hoop has been forced on as far as necessary.

WATER COOLER.—Wm. A. Hawthorne, Hawthorne, Nev. No. 291,595. Date, Jan. 8, 1884. This water cooler consists of a double compartment water-chamber, one compartment provided with an inlet, the other with an outlet, a peculiar connection of wrapped pipe between the two compartments, an air space or jacket surrounding the two chambers and connecting pipe and communicating with the outside atmosphere, whereby a draft or circuit is formed, and a means for spraying or keeping wet the entire surface of the chambers and connecting pipe.

ANIMAL TRAP.—Geo. W. Jolly, Paraiso Springs, Monterey Co., assignor one-half to T. J. Hattabaugh, San Jose. No. 289,268. Dated Nov. 27, 1883. This is a spring trap to be placed in the holes of rodents. The advantage claimed for the trap is principally in the method of impalement against the upper part of the burrow which will thus effectually prevent escape.

LOGGING ENGINE.—John Dolbeer, S. F. No. 290,755. Dated Dec. 25, 1883. This is a novel apparatus for moving logs or other heavy weights; and it consists of a vertical gipsy or winding device with gearing, by which it is connected with the engine and a swiveling rope-guide. The bed and frame are portable.

DIRT-SCRAPER.—C. Endicott, Kingsburg, Fresno county, No. 291,585. Dated Jan. 8, 1884. This scraper is for leveling land, and it consists in the arrangement of the bowl, wheeled axle, and the means for connecting them, the draft, and the means for dumping the bowl.

MINERS' COMBINATION TOOL.—John Ryan, Salt Lake City, No. 291,627. Dated Jan. 8, 1884. This combination tool is a device for holding a candle, for cutting fuse, for pressing the caps thereon, and for sustaining the tool.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
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Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to discontinue it, we shall positively demand payment for the time it is sent.

Eucalyptus and Boiler Scale.

Some time since mention was made in the newspapers of the country of the discovery of a successful boiler scale remover prepared from the leaves of the eucalyptus tree. Experiments had been made by Mr. Downie, of Salinas City, the discoverer, and Mr. McGillivray with whom he was associated, and it was claimed that the best results have been obtained. Since then the article had been put in the market by the Downie Boiler Incrustation Prevention Co., who now own the patents, and it has come into pretty general use on the Pacific coast. Twenty thousand dollars was raised for a working capital on the sale of rather a small part of the stock, and patents secured through Messrs Dewey & Co. for all the principal countries of the globe. The preparation must, upon the showing made by its use, have great merit in it. The principal difficulty with scale removers—at least, with those which would remove the scale—was that they tended to eat into the iron. It appears that the Downie Scale remover is made by boiling eucalyptus leaves in steam boilers made of regular boiler iron under 40 pounds pressure, and that the iron is now, after a constant use of eight months, as sound as when it came from the shop. All the engineers who have used it any length of time, as far as we can learn (such as those on the Pacific Coast Steamship Co.'s boats, the Baldwin and Palace Hotels, Union and Fulton foundries, Starr's Mills), testify that not only does the preparation not eat into the iron, but that it absolutely prevents rust; and that in the case of steamboats it prevents pitting from galvanic action. No new scale forms after the preparation is put in the boiler, and as soon as the old scale is removed the iron is covered with very thin coating which preserves the iron from rust or corrosion. Nearly a thousand boilers in San Francisco and the neighborhood are using the Downie remover, and the reports of the engineers are very unanimously in favor of its efficacy. There are many kinds of waters in this State, and in Nevada, and Utah, and in all kinds the results have been very satisfactory. Many virtues have been claimed for the eucalyptus tree, but it could confer no greater good on a very large part of humanity than by keeping the steam boilers clean, by decreasing the waste of fuel, labor of engineers and the danger of explosion. It seems indeed fortunate that our State has been so fortunately supplied with so important a remedy for so extensive an evil by the introduction so extensively of the eucalyptus trees from Australia.

OVER 100 liquor dealers in Portland have taken out licenses under the high license ordinance.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, January 2, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 63, of twenty-five cents (25c.) per share, was declared, payable on SATURDAY, January 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.

OFFICE—Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending December 31, 1883, the Board of Directors of the German Savings and Loan Society has declared a dividend on Term Deposits at the rate of four and thirty-two one hundredths (4 32/100) per cent. per annum, and on Ordinary Deposits at the rate of three and six tenths (3 6/10) per cent. per annum, payable on and after the 2nd day of January, 1884. By order,

GEO. LETTE, Secretary.

QUICKSILVER.

THE CELEBRATED A BRAND.

Shipped Direct from the New Almaden Mine,

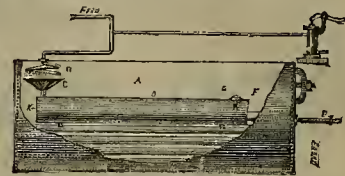
NEW ALMADEN, SANTA CLARA COUNTY, CAL.

J. B. RANDOL, 320 Sansome Street, S. F.

[P. O. Box, 2548.]

ELLIOT'S PURIFIER
FOR
STEAM BOILERS.

(PATENTED FEBRUARY 6, 1883.)



A—Boiler. D—Settler.
B—Feed Pipe. H—Legs to Settler.
C—Overflow Pipe. E—Blow-off Pipe.
G—Funnel. F—Check Valve.
K—Water Line.

A represents the steam room in the boiler.
B represents feed pipe, feeding by spray or otherwise, through the top of the boiler.
C represents the drip funnel conveying water to the settler D.

E represents the blow-off pipe to be used for cleansing the settler when required.
F represents the overflow pipe through which the water flows into the boiler after purification.
G represents the check valve opening upward, so that it will close when blowing off the settler.

H H represent the legs of the settler.
K represents the water-line in the boiler.
The drip funnel is on a higher level than the overflow pipe, causing the water to flow through the settler by gravitation.

The overflow pipe reaches down half-way into the settler, so as to trap the scum and oil, and to retain it until blown off through the blow-off pipe.

This device is warranted to keep the boiler from scaling; will cause all the old scale to come off; will in all cases prevent foaming, and will absolutely prevent explosions. It will prevent foaming, because no air will go into the water in the boiler; and the water fed to the boiler will become perfectly purified before mixing with the water in the boiler.

It will prevent explosions, because no scale will form in the boiler on the fire surface, thereby saving the iron from becoming heated to a red heat, as the water will be constantly in contact with the iron of the boiler.

The connection pipes of the glass water-gauges will not be clogged, because there will be no scum in the boiler to get into them.

There will be no leakage of the boiler from unequal expansion and contraction caused by cold water coming in contact with the iron of the boiler, as all the water upon entering the boiler will be of an equal temperature with that contained in the boiler. This is one of the great features of this invention, as all experienced engineers know who have been troubled by leaky seams and loose rivets in the boiler caused by cold water.

The advantages claimed for this invention are:
1. Simplicity.
2. Its efficacy without the aid of chemicals.
3. It causes no waste of space.
4. It utilizes the heat in the boiler which exists in it, except for the supply of steam.

5. It saves fuel by maintaining the fire surface and tubes clean.

6. It allows the boiler to perform its function without interruption.

7. It saves the trouble of cleaning the boiler by acting automatically.

8. It not alone eliminates impurities held in suspension, but also scum and fatty matter, which are lighter than water.

9. It supplies the boiler with water of a permanently equal temperature.

10. It will prevent the leaking of boilers.

11. It absolutely prevents foaming.

12. It prevents explosions.

CHARLES ELLIOT,

Inventor and Patentee.

OFFICE, 432 Montgomery St., San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company.

San Francisco, January 10, 1884.

At a meeting of the Board of Directors of the above named company, held on the 15th inst., Dividend No. 19, of ten cents (10c.) per share, was declared, payable on Thursday, January 31, 1884. Transfer books closed on Wednesday, January 23, 1884, at 3 o'clock p. m. This dividend is payable at the office in this city on all stock issued here and at the Farmers' Loan and Trust Company in New York on all stock issued there. WM. WILLIS, Sec'y.

OFFICE—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

Annual Meeting—Office of the Albion Consolidated Mining Company, room 26, Nevada Block, 309 Montgomery St., San Francisco, Jan. 14, 1884.

The Regular Annual Meeting of the Stockholders of the Albion Consolidated Mining Company will be held at the office of the Company, room 26, Nevada Block, 309 Montgomery St., San Francisco, Cal., on WEDNESDAY, the 30th day of January, 1884, at the hour of one o'clock, p. m., for the election of a Board of Directors to serve for the ensuing year, and the transaction of such other business as may properly come before the meeting. Transfer books will close on Monday, Jan. 28, 1884, at 3 o'clock p. m.

A. W. HAVENS, Secretary.

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SAFEST AND STRONGEST HIGH EXPLOSIVES IN THE MARKET.

THE ORIGINAL NITRO-GLYCERINE COMPOUND.

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Is acknowledged by all the Great Chemists of the World as Unapproached by any other Compounds.

The GIANT POWDER COMPANY have acquired the Exclusive Right to Manufacture

“NOBEL'S EXPLOSIVE GELATINE,”

Which contains **96 Per Cent of Nitro-Glycerine.** It is still STRONGER THAN DYNAMITE, and even SAFER IN HANDLING. This explosive was used in constructing the Mont Cenis Tunnel.

The Judson Powder

Is a Black Powder Owned and Manufactured by the

GIANT POWDER CO.

Is from THREE to FIVE TIMES STRONGER than Ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it

Breaks More Ground, Pulverizes Better and Saves Time and Money.

The only difficulty heretofore experienced by some consumers of this Powder has been that it required more time to get it to the bottom of a deep borehole. This has now been entirely overcome, and our

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Automatic Cut-Off Engine.
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Best Hoisting Engine and
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CHAMPION METALLIC WHEELBARROWS.

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National Compressors and Rock Drills.

On September 1, 1883,

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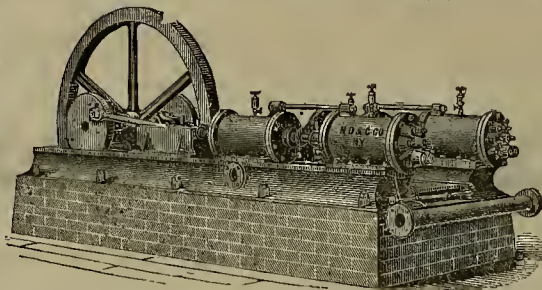
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In the Shape of a

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NATIONAL COMPRESSOR.

Jet Pumps.



The Cheapest and Best

STEAM PUMP

For Lifts from 10 to 70 feet,

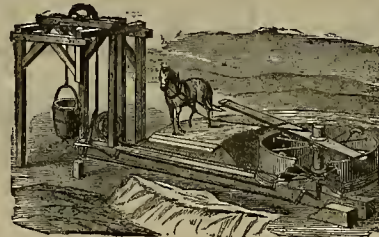
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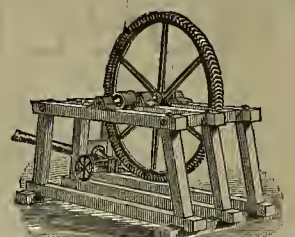
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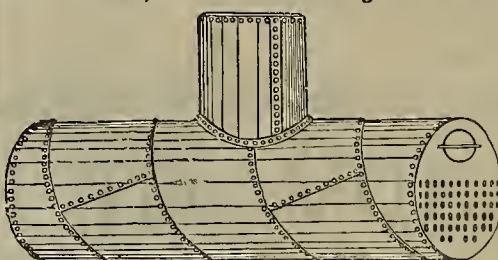
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MINING DEBRIS.

Full Text of the Decisions of Judges Sawyer and Deady.

The Points at Issue Legally Explained.

We give below the decision by Hon. Judge Sawyer, and the concurring opinion of Hon. Judge Deady which declared that hydraulic mining, as at present conducted, must be stopped. As this decision is important and far-reaching, both in its direct and indirect influences, we take occasion to present the decision to our readers in complete form.

Decision of Judge Sawyer.

By the Court, Sawyer, Circuit Judge. This is a bill in equity to restrain the defendants, below several mining companies, engaged in hydraulic mining on the western slope of the Sierra Nevada Mountains, from discharging their mining debris into the alluvial of the Yuba River, and into the river itself, whence it is carried down by the current into Feather and Sacramento Rivers, filling up their channels, and injuring their navigation; and some times, by overflowing and covering the neighboring lands with debris, injuring and threatening to injure and destroy the crops and property of the owners, situated on and adjacent to the banks of these watercourses.

REPORT OF LIEUTENANT-COLONEL MENDEL.

In March, 1884, the Secretary of War transmitted to Congress the official report of Lieutenant-Colonel Mendel, of the "corps of engineers upon examinations and surveys to devise a system of works to prevent the further injury to the navigable waters of California from the debris of mines flowing from hydraulic mining," which surveys and report were made in pursuance of the Act of Congress, relating to rivers and harbors, of June 14, 1859. This report, made in January, 1882, was introduced in evidence, and it has been quoted and recognized by both sides in the case, as showing the injurious results of hydraulic and other mining, up to its date, and the remedies attempted and suggested. It is, also, fully confirmed by the other evidence in the case, and by the condition of things as disclosed upon actual inspection and observation, made by the judges who traversed and examined the country affected by the operations complained of, in the presence and with the consent and representatives of the respective parties and their counsel. Many of the facts in the general statement will, therefore, be taken in a condensed form in this report.

HYDRAULIC MINING.

Hydraulic mining, as used in this opinion, is the process by which a bank of gold-bearing earth and rock is excavated by a jet of water, discharged through the converging nozzle of a pipe, under great pressure; the earth and debris being carried away by the same water, through sluices, into discharge on lower levels into the natural stream and watercourse below. Where the gravel or other material of the bank is cemented, or where the bank is composed of masses of pipe-clay, it is shattered by blasting with powder, sometimes from fifteen to twenty tons of powder being used at one time to break up a bank. In the early practice of hydraulic mining, as in 1859, the water was discharged through a rubber or canvas hose, with nozzles of not more than an inch in diameter; but later, upon the invention of the "Little Giant" and the "Monitor" machines, the size of the nozzle and the pressure were largely increased, till now the nozzle is from four to six inches in diameter, and discharges from five hundred to one thousand inches of water under a pressure of from three to four or five hundred feet. For example, an eleven-inch nozzle, at the North Bloomfield mine, discharges one hundred and eighty-five thousand cubic feet of water in an hour, with a velocity of one hundred and fifty feet per second. The excavating power of such a body of water, discharged with such velocity, is enormous; and, unless the gravel is very heavy or firmly cemented, it is much in excess of its transporting power. At some of the mines, as at the North Bloomfield, several of these monitors are worked, much of the time night and day, the several levels upon which they are working being kept constantly illuminated by electric lights, the electricity being generated by water power. A night scene of the kind, at the North Bloomfield mine, is in the highest degree weird and startling, and it cannot fail to strike strangers with wonder and admiration. The amount of debris discharged into the rivers by these operations can only be duly appreciated by actual observation.

THE YUBA RIVER.

The Yuba River is a tributary of Feather River, entering it at Marysville, thirty miles above the mouth of the Feather, where the latter joins the Sacramento. It is the fourth river in size in the Sacramento Valley, and drains about thirteen hundred and thirty square miles of the western slope of the Sierra Nevada Mountains, comprising portions of Sierra, Nevada and Yuba counties—its extreme breadth being about thirty-six miles, and its extreme length about sixty miles, excluding the headwaters of its tributaries. From the foothills to its junction with Feather River at Marysville, the elevation of the Yuba basin above the water is from two hundred feet at its lowest parts to about eight thousand feet at the summit of the mountains; but the gold deposits of this basin only extend to an elevation of from four to five thousand feet in a belt from forty to fifty miles wide. The upper portion of the river is divided into five principal branches, the North, Middle, and South Yubas, and Deer and Dry Creeks. The first four—Deer Creek being nearly as large as the smallest main branch—unite in the mountains before reaching the valley of Deer Creek, and form the last, Dry Creek, joining the main river in the valley, shortly after it leaves the foothills. The debris complained of is mostly discharged into the Middle and South Yubas and Deer Creek, and their numerous smaller tributaries.

DEPOSITS ON THE SAN JUAN RIDGE.

The auriferous deposit on the San Juan Ridge, between the South and Middle Yubas, embracing most of the main branch, and a larger part of the mines now actually worked belong under their

control, is much the largest and most important in the State, and is favorably situated for working. The debris of the auriferous deposits in which it lies being elevated several hundred feet above the beds of the Yubas and their tributaries, and the annual floods of the Yuba may be relied on to carry off a large portion of the debris resulting from mining. Says the report referred to: "The floor extent of the gravel channel and its branches on this ridge is about twenty-five miles. Debris is literally falling from the portion already worked, and for that too deeply covered by lava to be available for hydraulic mining, there remain, probably, not less than four or five miles of channel available for washing, from which only a comparatively small portion of the top gravel has been removed. Below San Juan the gravel body has a surface width of over a mile and a half, and is, say, one hundred and forty feet deep. From Baker Hill to Bloomfield, it is for the greater portion very much wider and deeper. At Columbia Hill its surface width varies from three thousand to four thousand to eight thousand feet, and it is from three hundred to six hundred feet deep. The gravel on this ridge is probably three hundred or four hundred feet deep. At North Bloomfield it is open to the bedrock, showing a depth of more than three hundred feet. Roughly estimating the average width of the remaining gravel range at four hundred yards, and, after allowing for the portion worked off, placing its average depth at twenty yards, the surface width at fifty miles, fifty miles per mile, or for fourteen miles, say seven hundred million yards."

RESULTS OF DEBRIS.

"Allowing for the amount washed since 1876, one hundred million yards, there remain six hundred million to be removed," adding to this the estimated amount still remaining to be worked at Smartsville, lower down the river, and the amount remaining to be washed will appear, says Colonel Mendel: "Seven hundred million of cubic yards may be assumed to represent the amount of gravel remaining to be worked off by hydraulic process, tributary to the Yuba." Approximately, then, according to the evidence, over one hundred million of cubic yards in the debris have been washed out by the hydraulic process, and the debris deposited in the Yuba and its tributaries; and seven hundred million more remain to be washed out, and its debris deposited in these watercourses in the same manner.

RESULTS OF WASHINGS.

The following shows some of the results of former washings, and unmistakably indicates what must result from a continuance of the work: The Yuba with its branches, and small tributaries, were necessarily characterized by heavy grades, the waters falling about eight thousand feet in a distance of ninety or a hundred miles from their extreme sources to the Feather River. They ran through steep, rocky canyons and gorges, over a rough rocky bottom, with frequent rapids, and waterfalls of greater or less height, and there were many deep bays excavated by the action of the water at the foot of falls, rapids, and the like. The debris of all these streams, from the very depths of the higher mines to the junction of the main Yuba with Feather River, a distance of seventy-five miles or more, have all been lifted up many feet deep—it some places to the depths of one hundred and fifty feet, and all the streams have regularly graded themselves, so that a railroad track might be laid upon their beds for the whole distance, the grade, of course, being steeper in the upper part, but equally regular.

BRANCHES OF THE YUBA.

Thus the main branches of the Yuba and Deer Creek, Shady Creek, Bloody Run, Grizzly Canyon, Humbug Canyon, and the other smaller tributaries, all exhibit this result. There are many square miles, in the aggregate, in the beds of these streams, during many feet deep with debris, and these channels are choked and clogged with it—the heavier material being deposited higher up and the lighter passing farther down. Most of it will from year to year be carried farther down, and ultimately down its way to the valley. The transporting capacity of the water, however, is unequal to the task of carrying off all the debris at once, as it is discharged into the stream. So, also, the ordinary floods, from year to year, are unable to carry off all the debris discharged into the streams during the year; and it, consequently, accumulates from year to year. The upper portions of the watercourses, within the mountains, till an extraordinary flood comes. When such a flood occurs, it transports a much larger amount at once, and precipitates it upon the valleys below.

FUTURE DANGER.

Vast amounts are now accumulated in the upper courses of the Yuba and its branches, which are liable to be precipitated in immense quantities into the valleys below, by any extraordinary flood—such as that of 1862—that may hereafter occur. With reference to the amount of these deposits remaining in the Yuba, above Marysville, Colonel Mendel, in his report, says: "The estimates by Mr. Manson, reported to the State Engineer, give the estimated deposits, in 1879, on the Yuba, above the foothills, as for six million four hundred and sixty-two thousand one hundred cubic yards, the gravel bulk to eight or ten miles; and below, twenty-three million two hundred and eighty-four thousand—a total of seventy-one million seven hundred and forty-six thousand one hundred cubic yards. In the light of later information, it seems probable that this estimate is altogether too low. The debris in small tributaries not having been taken into account, and the amount in the lower river having been much underestimated. The actual amount is not capable of being ascertained, and the statements are given merely for the purpose of illustration."

DEPOSITS ON PLAINS.

"At its escape from the mountains, where the foothills recede and give width to the plain, the Yuba spreads out its load of sand and gravel over a plain of fifteen thousand to sixteen thousand acres, which has risen to ten thousand above the level of the adjoining country on either side. This plain has a slope of about ten feet to the mile, varying above and below to the river as you ascend or descend, the slope of the river bed being a little less than the foothills and here feet at Marysville, ten miles below. The size of the material have some correspondence to the grades. Ascending the stream, one passes to a continually increasing average size of material. While it is nearly all sand below, above it becomes nearly all gravel, with, however, considerable admixture of finer material. This is the debris of the mountains has destroyed thousands of acres of alluvial land. The State Engineer, in 1880, estimated that fifteen thousand two hundred and twenty acres had been seriously injured by these deposits from the Yuba.

"On the Yuba, the great deposits of gravel are found on a grade of thirty feet to twenty feet, to the mile. The sands predominate greatly in slopes of ten feet and below."

VALLEY RIVER COURSE.

The portion of the valley here referred to as covered with sand is that portion of the borders of the Yuba River extending across the Sacramento Valley from the foothills to its junction with Feather River at Marysville—a distance of about twelve miles. Formerly, before hydraulic mining operations commenced, the Yuba River ran through this part of its course in a deep channel, with a gravelly bottom from three hundred to four hundred feet wide, on an average, with steep banks from fifteen to twenty feet high at low water, on either side. From the top of the banks, on each side, extended a strip of bottom lands of rich, black, alluvial soil, on an average a mile and a half wide, upon which were situated some of the finest farms, orchards and vineyards in the State. Beyond this first bottom was a second bottom, which extended some distance to the ridge of higher lands, the whole constituting a basin between the higher lands on either side, of from a mile and a half to three miles wide. Not only the channel of the river through these bottoms, but the strip of bottom lands on either side, and the strip of bottom lands on either side, were all covered with a layer of gravel and sand, many feet deep, from ridge to ridge of high land, and utterly unfit for farming and other purposes to which it was before devoted, and has consequently been abandoned for such uses.

DR. TEGARDEN'S RANCH.

Dr. Tegarden's ranch affords a very striking example of individual injuries indicated by this mining debris. Dr. Tegarden is a prominent citizen of Yuba county, having for some years represented the county in the State Senate. He owned twelve hundred and seventy-five acres on the Yuba bottom, some three or four miles above Marysville, on the north side. All, except the seventy-five acres now lying outside the levee, have been built up from three to five feet over with sand and gravel, deposited for farming purposes; for which industry he has received no remuneration. He now lives in a small house near the levee, on the outside, which is made to be swept away should the levee break opposite to him during an extraordinary flood. Dr. Tegarden testifies that the main thing up was in 1879, but that there had been a constant addition to it ever since, and that, during the last year, it has filled up faster than in any other time; that he built two miles of levee to protect it, but it proved inefficient; and that the land is five to six feet higher with sand and sediment on the river, or inside of the levee, than the land on which he lives. A considerable portion, but not all, of the lower bottoms of the Yuba were covered by the accumulation of debris brought down by the great flood of 1862; but it has been extending and deepening ever since. Much, perhaps most of it, was more or less covered by 1865 or 1869. Since that time it has been built up by the debris of the Yuba and Yuba county, which has been carried down the river for the purpose of protecting the lower portion of the elevation, and for the protection of Marysville and the adjacent country.

LEVEE PROTECTION.

In addition to the levees so erected five years ago, as O'Brien, who did the work, testifies, the miners themselves also built a levee for the same purpose, being the levee on the south side of the Yuba, from the foothills to the Headwaters, with which it connected at Heiges station, a distance of eight miles, at a cost of \$66,000, or which sum the defendants in this suit paid 80 per cent. This is the levee which, connected with the grade levee on the north side, protected the river from overflow on the south. It broke in three places in Lincoln township, in June last, when the Eglisio dam gave way, and the country for a considerable distance below, extending to the Eliza tract, several miles distant, was flooded, with some though not great damage to the crops. The river, however, having soon passed itself. Not only has all the space between these levees been filled with the debris to a level with the high lands upon which they are built, but for miles of the lower portion of the river, the filling, between the levees, is several feet above the level of the surrounding country on the outside. The levee on the north side is grown up with young cottonwoods and willows.

NO DEFINITE RIVER CHANNEL.

The river has now no definite channel within these bounds, but runs everywhere over the space between the levees, alternate two to three miles apart, according to the obstruction its waters meet from time to time by growing trees, or accumulation of drift-wood, or deposits made by itself, thereby raising the bed, where it actually, for a time, runs to a higher level than the bed of such surrounding channel as it has. This broad channel, or bed, such as it is, is several feet higher than the lands of the surrounding country outside the levees, which outside lands have no protection from overflow of the river. The Yuba, surcharged with debris, except the slender intervening artificial banks, so erected by the people and the miners for that purpose. The lands thus already buried and destroyed are over fifteen thousand acres, or twenty-five square miles; or, taking the average width, a tract from the foothills to Marysville, of from a mile to two miles wide, of from two to three miles deep. The filling in the river bed is generally twenty-five feet or more, and at its immediate junction with Feather River at Marysville, is about twenty feet deep—some witness a make it deeper—where it forms a bar of nearly that depth across Feather River. The depth of the filling is increasing year by year, and raising the bed of the river within the levees higher and higher above the surrounding country outside the levees. The depth of the filling increases as the river is ascended, till, at Squaw Flat, near Park's Bar, below Smartsville, at the entrance of the foothills, according to the testimony of O'Brien, a witness for the defendants, it is from fifty to sixty feet deep. Opposite Success Flat, above Smartsville, and at the narrow above Smartsville, sixty feet deep. The deposits constituting the first fifty feet, at Squaw Flat, have been there ten or twelve years, and the rest has accumulated since. At a point near this, at Rose's Bar, where the levee was once one hundred feet high, it has now been raised to the level of the canyon, it has now been raised by filling to a level of three thousand feet wide. But at these points no valuable lands are covered.

THE EFFECT UPON NAVIGATION.

The result, as affecting the navigability of the waters of the State, will be stated upon the authority of Mendel's report, which was made upon instrumental surveys and actual measurements, and is amply supported by other evidence. The low-water level of Feather River, at Marysville, the head of navigation, has been raised fully fifteen feet—at this time more—indicating a rise of the bed of the river to that height above its former bed. At the mouth of the river, at its former bed, it is fully five feet. Says Mendel: "Taking fifteen feet at Marysville and five feet at the mouth, the difference—ten feet—is to be added to the old fall. This increases the slope of the Feather, in its navigable part, four inches to the

mile. This increase has impaired the depth of water and the practicability of navigation to a considerable extent."

"Applying to the navigable portion of the Feather the rule accepted for the minimum deposit in the Sacramento, namely, that the average flow is equal to the elevation of the plane of low water, we will have, for the thirty miles from Marysville to the mouth, an average depth of ten feet over the bed of the river. This estimate is thought to be here as in the Sacramento, considerably below the fact." Some witnesses say it is now fifteen feet. Again: "As a consequence of these changes, a higher flood line and greater exposure to overflow now exists for all riparian lands on both these rivers. This is an element of considerable loss to the country, but its description and discussion do not come within the limits of this investigation."

RIVER BEDS.

"The elevation of the bed of the river is not accompanied by an equal rise in the level of the banks. The level of the bed approaches more and more the level of the banks. In the cases of the Yuba and Bear, non-navigable streams, the level of the beds has risen from a depth of a number of feet below the banks to an elevation of several feet above the banks."

"These instances may be taken to illustrate the ultimate condition of the Sacramento and Feather River, under a continuance of the influence to which they are now subjected. The probability of this result is a consequence of the fact that the debris is carried by the river, and the testimony on the point is conclusive, that there is no river of the Sacramento leaving its channel at Gray's Bend, and running some distance from Sacramento city to the west."

"In the Sacramento River, a similar rise in its bed has taken place, from the fact that, during the first ten years of mining, from 1849 to 1859, the low water plane in the river at Sacramento, was raised two and three-tenths feet. During the next ten years of hydraulic mining, from 1859 to 1869, the rise in this plane was doubled. It has raised fully six feet from 1849 to 1869. Says Mendel: "As a consequence of the elevation of the bed, the level of the river, in 1849 extended at least six miles above the mouth of the Feather, twenty-five miles above Sacramento, and was quite two feet at Sacramento, is now no longer noticeable above Headwaters, one mile below Sacramento. The tide, within the past thirty years, rose on these shoals as much as three feet."

BELOW SACRAMENTO.

"Twenty-five miles below Sacramento the river divides into two main channels, which unite below, the intermediate distance by the two channels being eleven miles by Old River and twelve miles by Steamboat Slough."

"In the earlier days of mining, and until six or eight years ago (about 1853), Steamboat Slough was the channel used by all boats and vessels."

"It is a part of the public history of the State, with which all the early settlers are familiar, that for years the comparatively deep channel of Steamboat Slough, and the river of the Sacramento from New York to Portland, Maine, and farther to run on the Atlantic Ocean out of New York, both of which either came round Cape Horn, or through the Straits, ran regularly through Steamboat Slough. This slough is now filled up, so as to be navigable for the lighter craft, and boats to use the shortest and easiest route, and the debris of the debris of the river have not only been filled and raised for several feet, but the channels have been largely contracted in width. So, also, from similar causes, the shoal water in Suisun, San Pablo and San Francisco bays, and in the adjacent waters of the bay, have been raised, and the navigable channels of these waters have been considerably and materially contracted. The debris from the river and the American of course could not be used to fill the Sacramento, below the mouth of the American and Steamboat Slough, as do some of the southern rivers, to avoid the amount of debris which the slough has been carrying down. San Pablo and San Francisco bays, but the debris of the Yuba of course is much larger amount of debris than all the other mines together."

"To speak of remedial means, Col. Mendel says: 'The effect of the case presented in the preceding pages seems to establish the necessity of measures to be taken to prevent, even in the event that no further contribution be made to mining debris, to the beds of streams.'"

RE-TRAINT UPON MINING DEBRIS.

"The preservation of river-beds and routes of drainage requires that effective restraint be imposed upon mining debris. Otherwise, these drainage lines may be expected to suffer the fate which overtook their prototypes, the Placocene rivers, which were obliterated by enormous deposits brought down by their own currents."

"It may be added that the conservation of existing facilities for navigation equally requires restraint of the flow of sand and gravel; and that no improvement of the channels can be expected until this result shall be secured. Under all circumstances, the great and essential step to any project, whether of alleviation, conservation, or improvement of."

"It has been shown that in the beds of the American, Bear and Yuba there are now lying many millions of cubic yards of material in positions where it is comparatively harmless, and that, each year, as a rule, adds something to the volume of these deposits, but that, whether anything is added or anything is subtracted, which is sometimes the case, depends upon the volume and power of the floods. As a rule, the mines supply more material annually than the floods are able to transport over the grades in the lower portions of the rivers. If the floods were of sufficient duration, the accumulations would be found lower down and in more dangerous positions. Instead of lying in the bed of the Yuba, they would be in the Feather and Sacramento."

"The waters of the Yuba are so charged with debris that they are wholly unfit for fishing, or for any other use, except the use of the water, which water is usually applied, without doing first taken out of its stream and allowed to stand to some unpolluted place and settle. As it comes down to Marysville, it is so heavily charged with sand as to render it unfit even for surface irrigation."

THE DRAINAGE ACT OF 1859.

In pursuance of the provision of the drainage Act of 1859 (Stats. 1859, 130), the State, under the supervision of the State Engineer and Col. Mendel, as consulting engineer, erected a brush dam for accumulating debris, about two miles to the north, across the Yuba River, from the ridge of high land, some eight miles above Marysville. At the ordinary flood in the following rainy season, a large section on the northern end and two other sections towards the south were swept away. According to the report of Hamilton Smith, its engineer, to the North Bloomfield Company, made in July, 1881, after the great flood, the dam was at its greatest height, fourteen feet. Its cost, being in the neighborhood of one hundred and twenty thousand dollars, and it broke in three places, as follows: "The east embankment at the northern end and

gish chancery reports, largely in relation to the sewage of large cities, towns or other organizations having the matter in charge, where these bills have been authorized by acts of Parliament to construct sewers and discharge the sewage into the streams, which, when constructed, created nuisance to land below; and in such cases it has been held that they took notice by implication, one must be limited to the acts clearly authorized, and that they could not create a nuisance as a desired object by the acts expressly authorized without creating a nuisance, they would be restrained. Although Parliament, being competent in its legislative capacity, could authorize nuisances or the taking of injury to private property, and the making of nuisances, it is not a duty on the Courts to do so, and the Courts were still more careful not to imply or infer authority to create nuisances not clearly given in terms by the Act. The following are some of the cases referred to: Attorney-General vs. County Hatch, 14 Jurist 451; Attorney-General vs. Chappell, 11 Jurist 481; Attorney-General vs. Farnham, 11 Jurist 481; Attorney-General vs. Birmingham, 4 Kay & J. 528; Attorney-General vs. Seed Corporation, 5 Id., 583.

The first observation suggested is, that none of these provisions, either State or national, has any relation at all to the subject-matter of the suit. They simply recognize and legalize custom and regulations by which miners' rights, as between themselves, upon the public lands may be secured, regulated and protected. They relate to "mining claims" alone—to the manner of acquiring and protecting rights in them. They refer to the extent of the claim, the number of tailing up a claim holding it, the evidence of title, etc., as between themselves and as against each other, and are not at all applicable to the rights of the Government or owner of the land. Much less do they attempt to give them rights as against private parties, vested with the fee of other lands in mining, and not even within the mining region. It has no relation to lands owned in fee by private parties. The principle acted upon was, that the Government owned the land, and that the owner of the lands in which the mines were found, as the proprietors of limited portions of the mines on the public lands actually in the possession and occupation, and to prescribe rules for the acquisition, regulation and protection of such limited rights. The principle was, that the State, under reference to other public lands in *Lamb v. Bavenport*, 18 *iw.* 620, and this statement of the principle was approved by the Supreme Court of the United States in *Star v. Star*, 94 *U. S.* 437, *note*. The provision to no way interfere, or attempt to interfere, with the rights of the owner of the fee of other lands, is equally less in any other lands; nor does it authorize, or attempt to authorize, any custom, or usage, or regulations which shall encroach upon the rights of others owning agricultural lands in fee, situated in the valleys many miles distant. On the con-

itary, it is expressly provided, that "such customs, usages, or regulations shall govern" only "when not in conflict with the laws of the State." A custom or usage attempted to be established, whether by minor or by a majority of the people, or by the majority of the lands of private owners, holding titles in fee from the Mexican Government, as old as the title of the United States, without first acquiring the right to do so by purchase or other lawful means, upon compensation paid, would be in direct violation of the laws of the State and of the United States, and of the Constitution of the United States. It would also be in direct violation of the express provisions of the statutes defining nuisances already cited.

AN AXIOM.

One of the earliest statutes passed by the first Legislature of California, adopted the common law as the rule of decision in this State; Stat. 1850, p. 219; and that statute has been in force ever since, except so far as modified by the Civil Code. *Sic utere tui alienum non leas*, is one of the fundamental maxims of the common law, more frequently cited and enforced, perhaps, than any other in the law. And this maxim is contained in force in Sec. 354 of the Civil Code of California, where it is translated: "One must so use his own rights as not to infringe upon the rights of others." Any custom, or usage, which would attempt to authorize the acts complained of, would directly violate this fundamental principle of the law. As we have said, it is in common law upon some very remote considerations of an act, the Judge observed that this rule was too indefinite to furnish a certain rule to be guided by in many cases; and it was insisted by counsel that it really had little significance or value; but this case does not lie so near the line of distinction as to call in doubt as to its application. No possible refinement or legal hair-splitting can exclude it from the operation of the rule. It is obviously within the rule, and so far from the horrors as to leave no possible ground for doubt as to its applicability.

THE OLD AND NEW STATE CONSTITUTIONS.

The first section of both the old and new State Constitutions provides, that "all men * * * have certain inalienable rights, among which are those of * * * acquiring, possessing, and protecting property." These rights must necessarily include the right to enjoy, without let, hindrance, or obstruction by others, the property so acquired, possessed, and protected; and is not competent for the Legislature to authorize any encroachment upon the rights of one class of citizens by custom or usage adopted by those pursuing any particular class of industries. Again, as we have already seen by other constitutional provisions, it is provided, that "private property shall not be taken or damaged for public use without just compensation having been first paid therefor," and "no person shall be deprived of his property without due process of law," and the same inhibition is put upon the States or the amendments of the National Constitution.

CUSTOM AND USAGE.

The customs and usages relied on would be in direct conflict with all these provisions, and consequently, if any such there are, they can not be valid. The customs recognized and validated by Congress are only the same "local" customs here recognized by the State legislation, except that the Acts of Congress not only regulate these matters among miners as between themselves, but also give them some rights as against the United States in the public lands, but in no other lands, and the limitation expressly put upon these customs and usages is, that they shall not be "in conflict with the laws of the United States or the State * * * within which the district is situated." Thus Congress is also careful not to give any countenance to the idea that private rights can be encroached upon under the guise of the customs or usages of miners, intended to be legalized. Again, such customs and usages recognized are "local" customs limited to the "bar or diggings" within which they are situated. They are not general customs, and such customs and usages are never up in this particular are not within the legislation invoked. Besides, customs to be valid under the common law must be reasonable. Can a custom or usage which should allow the whole valleys of California to be filled up and devastated, no matter how well improved or far they are, be reasonable? Such a custom would be valid if the custom relied on is valid. It is only a matter of degree, not of principle. The Supreme Court, in the *California* case, recognized the validity of any custom to mine in such a manner as to destroy or injure the property of others, even in the districts or diggings where the local customs and usages of miners are sanctioned by the statutes. But the California reports are full of cases, where the principle has been enforced, that the owner of the property must use his own property as not to injure another.

COMMON LAW AS TO WATER RIGHTS.

Said the Supreme Court in *Hill vs. Smith*, 27 Cal. 492: "This notion [that the rules of the common law as to water rights have been modified in California] is without substantial foundation. The reasons which should sustain the ground-work of the common law upon this subject remain unimpaired. The conditions to which we apply them are changing, and not the rules themselves. The maxim, *Sic utere tui alienum non leas*, upon which they are grounded, has lost none of its governing force; on the contrary, it remains now, and in the mining regions of this State, as operative as ever. The lawfulness of waters as a right in the past in any other country." And in *Richards vs. Kilgus*, 24 Cal. 74, the Court said: "He is bound to use his property as not to injure his neighbor's land, irrespective of the question as to which has the older right or title, and if through any fault or neglect of his he does not properly manage and keep in repair the water ditches, or overflows or breaks through the banks of the ditch and injures the lands of others, either by washing away the soil or covering the soil with sand, the law holds him responsible; and these are not examples of many others too numerous to mention, and too familiar to the State to require citation. The Supreme Court of the United States recognizes the principle of the maxim also in *Johnson vs. Kilgus*, 10 Cal. 400; and the position of the defendant in that case prevented him from doing this, and thus destroyed his mine claim. No system of law which would allow the owner to tolerate the use of his property in this way so as to destroy the property of another."

We are fully satisfied that the acts of defendants complained of are not authorized by any valid custom or usage, or by any valid law, statute or ordinance, of the State of California or of the United States, and that consequently they are entitled to such relief as shall fully and amply protect them from any further injuries to his property and any further encroachments upon his rights. What shall the remedy be? It would be difficult to appreciate too highly the importance of the mining interests. The fact is patent that immense sums of money have been and are being employed in this branch of industry. The holiness with which capitalists, and especially

these delinquents, have invested large amounts of capital; the perfection to which these enterprises have been carried; the enormous machinery and appliances for successful mining; the vast enterprises they have undertaken and successfully carried out; the energy, perseverance, great engineering and mining skill displayed in pursuing these enterprises, excite wonder and unbounded admiration.

REMEDY FOR THE GRIEVANCES.

In view of these undisputed, indisputable and well known facts, no one could possibly be more averse than we are to applying any remedy to the grievances complained of that must put an end to hydraulic mining, if any other can be devised, or at least none available in the present stage of the case. Two were suggested in Mendocino's report:

1. The purchase of large tracts of low lands in the valleys, which are now, or may be permanently covered with water, without material injury to navigation, or to other property owners, and turning the same into a river, with its banks, into them, using them as settling reservoirs.
2. The building of impounding dams at suitable points on the river to hold back the heavier portions of the debris.

PROPOSED REMEDIES.

The first seemed to be regarded as too expensive to be feasible. The second is the only one suggested and urged in this case, and much testimony has been taken as to the practicability and safety of the plan. As is usually the case, the views of different engineers and experts, distinguished in their professions, differ widely upon the points of practicability and safety. The larger number of witnesses called, and touch the larger amount of testimony, so far as mere opinion goes, are doubters in favor of the practicability, if sufficient means are furnished. But all the practical experiments heretofore made, at great expense, under the supervision of the State and of competent engineers, have been lamentable failures. The dams constructed were, doubtless, in many particulars, defective. But what guaranty have the Court and those whose lives and property are at stake that any future works of the kind will not also be defective? As at present advised, with some knowledge of the operations of the tremendous force of nature, we can not undertake to say, upon the mere opinion of experts, given in reliance, as in this case, upon the competency of the witnesses, would be practicable. We can not defend in advance what works shall be sufficient, and authorize the continuance of the acts complained of upon the performance of any prescribed conditions.

DIFFICULTY OF CONSTRUCTING DAMS.

In view of past experience, here and elsewhere with the damming up of waters, and of the wide difference of opinion of competent engineers on the subject, it is clear that we should not be justified in an attempt to prescribe in advance any kind of a dam under which a large community should be compelled to live, and the dread of a perpetual, seriously alarming, and ever present menace. Even the pure waters of Niagara, within the memory of man, have made a sensible impression upon their bed of competent rock, adapted for its purposes by an almighty and Omnipotent power. Portions of the solid earth from time to time yielded to the force of the mighty flood, and the completed dam, the Court presiding, the author of the article on Niagara Falls, in the *American Cyclopaedia*: "In the short of time hardly reaching back into the last century, during which observations, other than those of passing travelers, have been made and preserved, changes have taken place by the falling down of masses of rocks, the falling of which has been caused a slight recession of the water, when directed the gorge to the same amount upward toward Lake Erie. Thus, in 1818, great fragments descended at the American Fall, in 1838 at the Horseshoe Fall, and since 1855 several others have materially changed the aspect of the falls." *Id.*, p. 418. When Father Hennepin first visited Niagara, in 1679, the falls fell formed on the Canadian side of a huge rock, when divided and carried the current. At the time of the visit of the Swedish naturalist, Kalm, in 1750, the rock had fallen down and left the cataract, in respect to the number of falls, more nearly to its present condition. In 1842 Professor Hall made an exact scientific, trigonometrical and geological survey of the falls, and from his survey, and made a vivid and exact idea has been formed of the enormous mechanical powers which were at work here * * * The fall of water acts as a huge saw, cutting a channel in the rock at the rate of about one foot a year." *Id.*, p. 418.

NIAGARA CONTRASTED WITH YUBA.

These facts forcibly illustrate the tremendous power of the element against which the engineer must contend in his efforts to impound the mining debris. Yet it is proposed to erect a barrier in the narrows of the Yuba, upon a head of debris now sixty feet deep, that out of the foothills, and augmented and deepened, as high as Niagara, over which the water is carried in a narrow gorge, charged at times with great quantities of heavy material, on occasions of great floods will pour in volumes equal, perhaps, or nearly so, to those pouring over an equal space at Niagara. It is also that this proposed dam will be a debris dam, and less dangerous than a water dam. But Niagara cannot be said to be a water dam in any other sense than the one proposed when filled, or nearly filled, with debris. The danger shown by the testimony will be, not so much from the pressure above as from the force and effects of the water greater or less dimensions, falling over and down the dam so great a distance, according to the testimony of Hamilton Smith, the very intelligent, competent and reliable engineer who built the English dam, there were rocks in it of ten tons weight, not a vestige of which could be seen after the breaking of the dam in June last. They must have fallen from the top of the dam down the stream, or crushed to pieces by the overtopping forces brought to bear upon them. And according to the testimony of another witness, who followed down the Yuba to observe the effects of the torrent resulting from the breaking of that dam, rocks of much larger dimensions were exhumed from the bed of the river, had wholly disappeared. The dams would show the enormous resisting power required to render an impounding dam perfectly safe. Engineers, as before stated, offer as to the practicability of building a safe dam at that or other points. We cannot presume to determine the possibilities of constructing dams with "money enough" at command, where distinguished engineers differ in opinion upon the point. It is enough for us to know that the matter rests in mere opinion, and that the opin-

ions of men eminent in their profession are not in accord upon the question. It is obviously impossible that the Court should determine in advance what dams may be built that will be sufficient, or prescribe any conditions upon the fulfillment of which defendants should be permitted to continue the acts complained of.

EFFICACY OF DAMS.

According to the testimony of some intelligent witnesses, only about seven per cent of the debris would be retained by any dam, as all that the water is capable of carrying in suspension would pass over under any circumstances. This percentage of the enormous quantity yet to be mined would add a great deal to the amount now in the stream. A large amount, at all events, would necessarily pass over.

Dams, such as are proposed, properly constructed, and not carried too high, may well be safe, and extremely valuable in keeping back the debris now in the stream, and largely mitigating the injuries now existing and threatened, even though utterly inadequate to protect the valleys below, in case hydraulic mining continued, and enormous quantities of debris be added to that already accumulated. But there are no dams now of any appreciable service in protecting the rights of complainant from further injury, either from the debris already in the streams or such further accumulations as may arise from a continuance of hydraulic mining as now pursued. There is therefore no alternative to granting an injunction.

MINING AND AGRICULTURAL INTERESTS.

A great deal has been said about the comparative public importance of the mining interests, and also the great loss and inconvenience to the defendants if their operations should be stopped by the Court. But we have no concern with the comparative importance of the interests with which we have nothing to do, but simply to determine whether the complainant's rights have been infringed, and if so, afford him such relief as the law entitles him to receive whatever the consequence or inconvenience to the wrongdoers or to the general public may be. To similar suggestions, in Attorney General vs. Council of Birmingham, where the Council of Birmingham, having a population of two hundred and fifty thousand, was the nuisance complained of, the Vice Chancellor said: "Now, with regard to the question of plaintiffs' right to an injunction, it appears to me that, so far as this Court is concerned, it is a matter of almost absolute indifference whether the nuisance is a public one or a private one, or whether it affects a population of two hundred and fifty thousand, or a single individual carrying on a manufactory for his own benefit. * * * I am not sitting here as a Committee of Public Safety, armed with arbitrary power to prevent what, in its view, will be a great injury, not to Birmingham only, but to the whole country; that is not my function." 4 Kay J. 639; see also *S. O. vs. Bandy*, 100 Ala. 1, 17 Heald, 1 R. L. Eq. Cas., 77. So in Attorney General vs. Council of Birmingham, the Vice Chancellor observes: "It is said * * * unless the defendants are permitted to throw all their sewage upon their neighbors' lands, upon which they have no more right to throw it than upon the lands of the plaintiffs, the sewage will [which contained two thousand and two hundred pounds] and, therefore, they contend that they must be permitted to dispose of the whole of the sewage on their neighbors' lands. Surely, the mere statement of the proposition is quite sufficient to refute it. Nobody can suppose the law of England to be in that state. It is not to be supposed that the sewage of Birmingham would in the case of Attorney General vs. Birmingham, that two hundred and fifty people will be made so inconveniently if they are not allowed to use their neighbors' property without paying for it; that on that account they are to use their neighbors' property without paying for it. * * * This Court does not decide what the law is as it exists, but what it is as it is applied to the facts of the case. It is not to be supposed that to order anything done that is impossible, as in the illustration I have given, but to take care, subject to that modification, that persons shall be restrained from exercising with a high hand powers which they have no right in law to exercise." 4 L. R. Ch. App. Cas., 165.

AN ENGLISH CASE.

In these cases the acts causing the nuisance were urged as absolutely necessary to the safety of the people interested—to three hundred thousand people in the case of the city of Birmingham—but the defendants were plainly informed that it was not the duty of the Court to pilot out now the nuisance should be avoided, but that, however necessary to the safety or convenience of those interested in the continuance, they must find a way to prevent the nuisance, or cease to perform the acts which occasioned them. Certainly, the law is not less favorable to the protection of the rights of every man, under the several express constitutional restrictions before referred to in this country, than it is in England, where there are no such limitations on the legislative power of the Government, and where the same effect in our reports. In *Weaver vs. Eureka Lake Co.*, 15 Cal. 274, the Court said: "It is contended that, under the circumstances, the erection of the dam was justifiable and proper, and that the great value of the lakes as reservoirs is a sufficient justification for the injuries resulting to the plaintiff from the dam. No principle of law upon which such a position can be maintained. * * * A comparison of the value of conflicting rights would be a novel mode of determining their legal superiority." And in *Wix vs. the Bear River etc. Co.*, 24 Cal. 373, the Court said: "The four remaining instructions asked of the Court are founded upon the theory that, in the mining districts, the rights of the rights of miners and persons owning claims constructed for mining purposes, are paramount to all other rights and interests of a different character, regardless of the time or mode of their acquisition; thus annihilating the doctrine of priority of cases where the contest is between a prior or different owner, who claims the exercise of any other kind of right, and the ownership of any other kind of interest. To such a doctrine we are unable to subscribe, nor do we think it clothed with a plausibility sufficient to justify us in combining it." But authority is not necessary on so plain a proposition. Of course, great interests in the continuance of the mining, or in the destruction of the property, are not to be considered as a matter of course, but as a matter of course, the rights of the owners of the property are paramount to all other rights and interests of a different character, regardless of the time or mode of their acquisition; thus annihilating the doctrine of priority of cases where the contest is between a prior or different owner, who claims the exercise of any other kind of right, and the ownership of any other kind of interest. To such a doctrine we are unable to subscribe, nor do we think it clothed with a plausibility sufficient to justify us in combining it." But authority is not necessary on so plain a proposition. 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hydraulic miners, to send their debris down these rivers regardless of the injurious consequences to the navigability of the subject property.

2. That the defendants have done the acts complained of for so long a time and under such circumstances as to acquire a prescriptive right to continue the same; and

3. That the suit is barred by the Statute of Limitations of the State; Secs. 319, 343, of the Code of Civil Procedure.

In the exercise of his power to regulate commerce and establish post roads, the United States may impair the navigability of a water-course within a State; but it has no power, either as a land owner or sovereign, to impair or obstruct the navigability of such water for the mere purpose of promoting or facilitating the working of mines upon the public lands, either by itself or its grantee.

PRIVATELY NOT CONFERRED BY THE UNITED STATES.
The United States has not attempted nor intended to confer upon the defendants any right or privilege to locate or fill the waters in question, or to in any way injure the property of another or impair the use or enjoyment thereof as a water-course for the mining of other persons. The Act of July 9, 1866, 15 Stat., 231, and the Act of July 9, 1870, 16 Stat., 217, and May 10, 1872, 17 Stat., 97, in making the public lands public, and the public lands and to provide for their sale under certain circumstances, subject to the power of the State to make rules concerning "encroachments and drainage necessary to their complete development." But this latter clause does not confer any power over the subject upon the United States which Congress did not possess. Indeed, it is only a prudential declaration of what there ought never to have been any doubt about, that the sale of the United States to the purchaser did not prevent the State from exercising whatever police power it may of right have over the subject.

The State has no authority to allow the defendants to use these waters or the adjacent lands, for the purpose of depositing therein or thereon their mining debris, otherwise than by Secs. 1, 2, 3, subdivision 5 of the Code of Civil Procedure, which provides that "dumping places for workable mines" and "other natural or otherwise" for the flow of tailings may be taken under the right of eminent domain as for a public use.

AN UNCONSTITUTIONAL PROVISION.
The Supreme Court of the State has already decided that this subdivision 5 is unconstitutional when applied to a case of a single person seeking to condemn private property, as a dumping or depositing place for mining debris. It is difficult to see on what ground a taking of property by any number of persons for such a purpose can be held to be a taking of private property for a public use. But that as it may, this section does not authorize the defendant to use the plaintiff's lands, or the easement appurtenant thereto, as a dumping or depositing place for the tailings from their mines until the same has been duly condemned for that purpose and compensation made to the owner.

By Sec. 3 of the Act of 1872 the State into the Union, 18 Stat., 452, it is declared, "that all the navigable waters within the State shall be common highways." These words mean anything, the State is authorized to restrict or prohibit or authorize obstructions to the navigation of the Father and Sacramento, which shall prevent their being used as common highways, according to their capacity and condition when the State was admitted. See Hatch vs. Willmet Iron Bridge Company, 7 Saw., 127.

THE DEFENDANTS HAVE NO PRESCRIPTIVE RIGHT.
The defendants have no prescriptive right to do the acts complained of.

And, first, there is no such continuity of possession, occupation, or use between these defendants and the many persons who may have preceded them in the occupation of the lands, and the mines in this region, as to constitute a similar wrongful act as to the injury of the plaintiff, or his co-defendants, so as to entitle them to claim the benefit of such acts or the time occupied by them in support of their plea for prescription. But, as the rule is, that the use of an easement for such time as the statute makes an adverse possession a bar to the recovery of the same, if the premises establish a prescriptive right thereon, this question is not material, as the defendants appear to have been in the use of the rivers and adjacent lands for the flow and deposit of their tailings for five years before the commencement of this suit. But this is a public nuisance. No one has the right to create a nuisance to come to a public nuisance against the public; and I think the better opinion is, that an individual who sustains a special injury from such nuisance may maintain a suit for its abatement or an injunction to restrain its further commission without reference to the lapse of time.

ACQUESCENCE.
But it is essential to a prescriptive right to an easement in or upon the property of another that the owner should acquiesce in the use. While five years' uninterrupted use of the waters of the Yuba and Feather by the defendants, as a place of flow and deposit for the debris of their mines, so as to fill the channels to a depth of no more than two feet, might, under some circumstances, be sufficient evidence of an acquiescence in such use by the plaintiff, it is not evidence of his acquiescence in the use of such waters for that purpose, so as to fill the channels to a depth of eleven, twelve, or more feet. The difference of one foot in the channels is a vast difference, and the result to the plaintiff, both as to the navigability of the rivers and the depth and extent of the consequent overflow and deposit on the adjacent lands.

In the case of a continuing and increasing trespass, it would be both illogical and unjust to infer an acquiescence in the latter and more injurious act, merely from an acquiescence in the former, in the earlier and less harmful one.

SPREAD OF TAILINGS.
Now, the evidence in the case shows beyond a doubt that the fill of the rivers, and the consequent overflow and spread of the tailings, has increased year by year, for the past ten years. And if the defendants continue to work their mines as they have done, this increase may reasonably be expected to go on from year to year, requiring an additional outlay for the erection and elevation of levees each year, and causing great risk and danger to the persons and property in their vicinity.

There is no direct evidence of acquiescence in this case; and there is really little or no reason in the circumstances for saying that the plaintiff or the community acquiesced in the deposit of mining debris in these waters ever acquired in any proper sense of the term in the good faith of those who have been situated in the latter and more injurious to him and them. Rather, it may be said, that they have borne a burden—not so heavy or dangerous as that, but gradually growing more so, until it has become intolerable—which, owing to the state of things heretofore existing in California, they could not well avoid if they would.

DAMAGE BY WASHING SOIL INTO RIVERS.
But as the developments of later years, following the introduction into the mines of those wonderful hydraulic engines, "The Monitor" and

"Little Giant," throwing a stream of water upon the gravel and sand banks, in some instances of nine inches in diameter, under a pressure of from two hundred to five hundred feet, have shown the serious character of the injury produced, a threefold increase in the production of this liquid and unlimited washing of the mountains into the rivers and on to the adjacent lands, the agricultural and commercial interests and communities are seriously affected thereby have begun to make themselves heard where once the temporary convenience of an individual will of the water was the only law. Since then the persons suffering from this wrong have subjected and prostrate against its continuance in many ways, until finally they have, in the person of this plaintiff, appealed to this Court for the relief to which they are entitled.

There is no statute of limitations applicable to this suit. Sec. 319 of the Code of Civil Procedure of California, created by the defendants, is void in actions involving the right to the actual possession of the time to real property, and not a mere easement in the land of another. When, by lapse of time, accompanied by an undisputed user, a party acquires an absolute right to such easement, he is said to be entitled by prescription.

AN EXPERIMENT.
On the argument, counsel for the defendants insisted that dams could be built on the Yuba, above the valley, as, for instance, at a place called "The Narrows," just above Smartsville, that would prevent the flow of debris from the mines and permanently detain them in the mountain courses of the river; and upon this assumption it was asked that if the Court found that the defendants were committing a nuisance to the injury of the plaintiff, as alleged in the bill, that the Court should not, by its decree, require the defendants to build such dams, but that they should be left to their own devices to build such dams, and in the meantime allow them to operate their mines as at present. In other words, the Court is asked to allow the defendants to continue the commission of the nuisance unrestricted until they can try the experiment of a dam or prevent the nuisance by means of a dam.

In my judgment, this would be a most lame and impotent conclusion from the premises. If the defendants can devise and carry out some lawful plan for impounding their debris in the mountains, they are at liberty to do so, so far as the plaintiff is concerned, but the experiment ought not to be tried at the expense of the plaintiff or by the denial or postponement of the relief to which he is now entitled. The injunction which the plaintiff seeks will not prevent the defendants from building dams, if they are otherwise entitled to do so, or from ultimately working their mines if it is shown that by such means it can be done without injury to the plaintiff.

PLAINTIFF ENTITLED TO RELIEF.
Whether a dam can be constructed to stand the pressure to which it will necessarily be subjected under these circumstances, and whether it will be of any material use in preventing the flow of the debris and the filling of the river banks, are questions in which I am not fully versed. But from the evidence in the case, and my observations of the premises, I am strongly impressed with the belief, that sufficient of the debris would still pass over the dam in suspension with the water to maintain and even increase the present fill of the river.

Besides, it is a very serious question in my mind whether any person or company ought to be required to submit to the continuous peril of living under or below such a dam as this must necessarily be, if it is made high enough to impound less coarse material; and this merely for the convenience of another person or persons in the pursuit of his or their private business. It may be likened, in part, to the direct pathway of an impending avalanche.

I think the plaintiff is entitled to the relief asked, and concur in the decree ordered.

A Noble Work.

EDITORS PRESS:—I have written the inclosed article for the purpose of making known to your readers the bed-rock principles which underlie the action of the Boys and Girls Aid Society. We wish them to be completely understood by the whole people of the State. Your paper goes among the best industrial classes. They are the very men in whose families boys should be placed.—J. C. KEMP, 228 Ellis street, San Francisco, Cal.

Juvenile Reform.

The Boys and Girls Aid Society, whose exceedingly limited and unpretending home is located at 68 Clementina street, San Francisco, has in the most thorough manner solved the great question, How shall we save to good citizenship our orphan, neglected and wayward children? And being deeply impressed with the fact that this is the most vital issue of the present time, and that the whole people of the State should be made fully acquainted with the plan of this admirable organization, we propose in the present article to give a clear and concise explanation of its method, which has proved the most pronounced and eminent reformatory success of the West, its grand work during the past twenty months having no parallel, either in this or any other country. First of all it bases its action on the great fundamental fact that the well ordered home and family constitute the distinguishing mark between civilization on the one hand and barbarism on the other; and that to this source and this alone must we look for all youthful reformation. It is opposed, first and last, to the wretched, imbecile, institutional idea, which during the past forty years has cost the people of America millions of dollars, and resulted in a harvest of criminals so large that the combined resources of every prison in the land stretched to the utmost tension is not adequate to contain them. Reformatory and so called industrial schools have had their day, and a most terrible and fearfully expensive one it has been, intelligent people everywhere having become fully alive to the fact that such places are, in most cases, nothing more nor less than dens of iniquity, nurseries of crime, and hotheds of the most loathsome and revolting practices, in which children are practically educated, to finally gravitate, first to the jail or House of Correction, next the State prison, and last of all, in

many cases, to an ignominious end upon the gallows.

The Boys and Girls Aid Society, whose method like everything else in nature that is truly useful, is pre-eminently simple, has accomplished results greater and less expensive than those of any other reformatory organization that ever existed, every detail having been brought right down to the most economic basis. To explain more fully, it costs the society to take a boy or girl, feed, clothe and discipline either, and finally place him or her in a well ordered home, then to remain (still under the society's oversight) until of age, then to go forth fitted to assume the duties of life, the comparatively insignificant sum of seven dollars and fifty cents. These are the exact figures, as shown by the records of the society kept during the past twenty (20) months. The expense for food has been so low, that the officers of the society have actually felt a great reluctance to state the amount, which is only eight cents per capita, per day, and which also includes both fuel and light, the children too being better fed than those of any institution we know of; and this the result of bed-rock management—of the employment of no unnecessary help whatever. And in this connection we will state that a Superintendent Assistant and Matron constitute the whole paid force, these three persons performing every duty, aided only by the assistances of such boys and girls as can be made available, there being on an average sixty at its home. Let this reader take the record of reformatory institutions in general, and see what this amount per capita has been. It has cost the State of California about seven hundred and fifty dollars to educate and qualify for the business of robbery, murder and arson, the average of its well trained graduates during the past twenty years, the truth of which assertion can be seen at a glance by reference to its State and Municipal reports. Seven dollars and fifty cents to place a boy or girl in a good home, there to be schooled and brought up for the duties of life by the true method ordained by the Supremes Being, and seven hundred and fifty dollars to make a red handed criminal out of either by the accursed system, acts and tricks, invented and presided over by Satan. Is it not time that the fathers and mothers of the children of this generation looked this most vital matter squarely in the face, and will not, and should not every charitably disposed man and woman in this fair land, in our own beautiful California, come at once to the rescue and help with money, material, word and deed, this noble organization, that during this short period of twenty months has rescued from the very jaws of utter ruin, seven hundred of our boys and girls, and placed them in happy, well regulated homes, where, as the records show, there are but two of this number, placed outside of San Francisco, that are not doing well, that are not fairly on the high road to true sovereign independence.

The society owns a lot on Clementina street, San Francisco, 25x80 feet in size, and their home (a plain wooden one) covers the entire area. In this building the boys and girls are kept just long enough to determine each one's individual characteristics, and then quickly as possible sent away to the most appropriate home that can be found. This process is constantly going on, the building being simply a depot, and not an institution in any sense of the word. As we said before, it needs money at all times. Its quarters are entirely too small, and far more commodious ones are needed, so that it can be enabled to extend its operations, and provide ten children with homes where it now provides but one. It receives no aid whatever from state, county or municipality, except through the few boys and girls occasionally sent to it in conformity with Section 1338 of the Penal Code, but depends wholly upon charitable contributions for the means to meet its obligations.

One of its most pressing wants is a good, reliable, big-hearted Corresponding Member in each town and city in the State, who will act in such capacity without remuneration except the true, pure satisfaction such a noble position should afford and the unqualified respect it would certainly command. Such an one, furnishing all necessary information to those in his or her district who desired to adopt, indenture or employ a boy or girl, and also to act as a sort of consul for both parties, seeing that each lived strictly up to his portion of the contract.

Remarkable Artesian Well in "San Joaquin County.

EDITORS PRESS:—On the farm of Cutler Salmon, between Latrop and Stockton, on the French Camp road, there is an artesian well that deserves a detailed description. It is in reality a double well; the outer casing, seven inches in diameter, is sunk to a depth of 844 feet; inside of this there is another three and three-fourths inches in diameter, sunk to a depth of 1,250 feet; the former throws a jet of water to the height of 16 feet, and the latter 22 feet 8 inches. The flow is 300 gallons per minute, or 432,000 gallons every 24 hours, and the temperature of the water is 80 degrees Fahrenheit. The water from the larger well is of excellent quality, and is used for domestic purposes, the owner claiming considerable medicinal virtues for it, especially in trouble with

the kidneys and urinary organs, having himself been entirely cured of some very distressing symptoms by the use of this water. The water from the smaller boring is not so good, and is used only for irrigation. From these wells there is an extraordinary issue of gas, which the owner has utilized by an ingenious contrivance. He has placed a galvanized cylinder over the mouth of the well, which serves as a gasometer or tank, and catches part of the gas as it bubbles up through the water, which is in a constant state of effervescence till it has discharged the gas and run out of the reservoir into the ditch that is used for the purpose of conducting it over the land. Pipes are laid on from this gasometer to the house, about 100 feet distant, which is lighted and heated by the flame from this gas. In the kitchen, an ordinary cooking stove has been converted into a gas stove by laying 2-inch pipe on the fire basket, connected with an outside pipe just like the fire-back of a common stove, and all the cooking is done there with astonishing cleanliness. In the sitting-rooms, common sheet-iron stoves are converted into gas stoves in the same way, and besides the economy and cleanliness, the temperature of a room can be regulated by simply turning a stop cork. As this gas appears to be inexhaustible, no attempt was made to economize in its use for illuminating purposes; and when turned on full, two burners thoroughly lighted every part of a room 17x13, so that one could read comfortably at the furthest corner. When less force was given the flames burned blue and lost some of its illuminating power; this defect, however, might be remedied by using a particular kind of burner, with finer perforations than the ones in use. The gasometer is only 3 feet in diameter and the reservoir 12, so that much of the gas escapes, and it is impossible, from the simple means used to collect it, to calculate how much gas rises with the water. At the margin of the reservoir, a lighted match held to the bubbles ignites the gas that escapes from them as they burst. This well has been in operation since it was finished in August, 1883, and there has never been any diminution in the supply of either gas or water.

The cost of sinking this well, including the frame building over it, the gas pipes and fixtures, plumbing, etc., was entirely covered by the sum of \$3,600.

Should time demonstrate that the supply of gas is permanent, it would be easy to run it into Stockton and light that city much cheaper than could be done by any other method, and at the same time be of immense value to its fortunate possessor.

CHARLES F. GOMPERTZ.

Modesto, Cal., Jan. 14.

In Twenty Years.

Among the congratulatory notes which we have received on the completion of our first score of years as a firm, is the following from an old Californian, who, though distant, has still at heart the interest and progress of his old friends, and of a State in whose advancement he rejoices:

Messrs. Dewey & Co.—Gentlemen: As one among your host of friends, allow me to congratulate you upon recently passing unitedly time's score as a business firm, also the journalistic score far in advance of all rivals and competitors on the Pacific coast, entering the race since the 1st of December, 1863.

Twenty years in this earth's chronology is an infinitesimal fraction of time. With man it marks a generation. History records no such complete and wonderful changes—national, political or social—occurring as within the last score. The legalized con-sorting of freedom and slavery no longer exists in these United States. Years of war and the blood of a host of martyrs was required to verify as truth what had existed only in theory. Japan, from time immemorial shut up and excluded from the world, now ranks among the most progressive of people. Ancestral China, with consecutive historical records ante-dating time as previously computed, proudly exclusive, bigotedly conservative, anxiously seeks admission into the convulse of nations. Geographical research has lifted the veil from a vast continent, with its millions of idolatrous inhabitants. A boundless field is opened to the philanthropist, the missionary, the trader and the agriculturist. The long sought for sources of that ancient, yet mysterious river, the Nile, have been determined, after baffling adventurous travelers of many nations for generations. The vexed problem of an Arctic passage has been solved. Science has subjugated to man's uses the most erratic, subtle and powerful of nature's forces—electricity, which lights, speaks, writes and labors for him, with possibilities of development beyond conception. From earth's deeply buried resources fountains of oil have poured forth, lubricating the commercial wheels of this and other lands, added millions to our wealth, a priceless benefit to mankind.

Space forbids more than this tracing a few of the most prominent of the many objects, dating within the past twenty years. With the complacency of the season, coupled with a wish that you may enjoy many returns, with increased abilities of appreciation,

G. C. PEARSON.

Danville, Ill., Jan. 1, 1884.

UTAH'S MINERAL PRODUCTION.

Wells Fargo & Co's Statement for the Year 1883.

BASE BULLION.	POUNDS LEAD		OZS.	
	REFINED.	UNREFINED.	SILVER.	GOLD.
Frisco M. & S. Co.		960,921	44,623	404
Cermania Lead Works	3,230,547	2,970,000	289,070	050
Hanauer		8,764,542	446,764	1,665
Horn Silver Mining Company		30,112,153	1,103,362	
Mingo Furnace Company		11,666,400	285,101	906
Net Product Base Bullion	3,230,547	54,474,021	2,168,960	3,925
Lead, Silver and Gold in Ores shipped		6,957,943	140,396	657
Matte containing Copper			41,884	1,115
Total	3,230,547	63,431,964	2,351,194	5,597
DORE BARS.				
Ontario Silver Mining Company			1,700,224	
Silver Reef District			416,505	
Tintic M. & M. Company			49,884	654
Other Mills and Placers			13,960	740
Total Dore Bars			2,180,573	1,394

RECAPITULATION.

3,230,547 pounds Refined Lead, at 5 cents per pound	\$ 161,527
63,431,964 pounds Unrefined Lead, at \$50 per ton	1,585,739
4,531,763 ounces Silver, at 1.10 per ounce	4,984,939
6,961 ounces Gold, at \$20 per ounce	139,220
Total Export value	\$6,872,085

Computing the Gold and Silver at its mint valuation and other metals at their value at the seaboard, it would increase the value of the product to \$8,000,000.

Comparative statement showing the quantity of the silver and gold contained in base bullion produced in Utah:

YEAR.	Total Ounces of Silver produced.	Total Ounces of Gold produced.	Ounces of Silver in Base Bullion.	Ounces of Gold in Base Bullion.	Percent of Total Silver prod.	Percent of Total Gold prod.
1877	4,350,703	17,325	2,102,098	11,035	48 2-10	63 6-10
1878	4,357,328	15,040	2,108,339	10,165	48 3-10	67 5-10
1879	3,635,047	15,932	1,797,539	5,638	46 6-10	35 7-10
1880	3,763,566	8,020	1,403,519	2,878	37 1-10	35 8-10
1881	5,400,191	7,956	2,043,699	2,622	48 9-10	32 9-10
1882	5,438,444	9,039	2,581,759	5,016	47 3-10	55 5-10
1883	4,531,763	6,991	2,351,190	5,597	51 8-10	80
TOTAL	31,706,042	80,305	14,968,723	43,006	47 2-10	53 5-10

Comparative statement of the value of lead bullion, including silver and gold necessarily produced in its manufacture west of the Missouri river, compiled from the annual reports issued by John J. Valentine, General Superintendent of Wells, Fargo & Co., San Francisco

YEAR.	Total Value of Precious Metals, including Lead.	Total Value of Lead Bullion including Gold and Silver Contents.	Percent of Entire Products.
1875	\$31,154,622	\$14,740,581	16 1-10
1879	76,349,501	19,234,394	25 5-10
1880	50,167,936	28,114,564	35
1881	64,604,417	30,253,430	38 5-10
1882	92,411,835	35,798,750	38 7-10
TOTAL	\$413,568,311	\$128,141,710	30 0-10

Olive Oil Manufacture.

Elwood Cooper writes to the Santa Barbara Press, as follows:

The berries are dried before crushing, as it is necessary to evaporate a portion of the water. If, however they are left out on the tree until shriveled, which is proof that necessary evaporation has already taken place, no drying is needed after picking. This late picking is not best, as mentioned in a previous article. If dried by the sun, it requires about fourteen days. This plan cannot be depended upon, excepting years when fruit is early ripe, and we have continuous sunlight, with moderately warm weather. By artificial heat ranging from 110° to 130°, the drying can be done in less than forty-eight hours. The crushing and pressing should follow without delay—that is, the fruit taken from the drier in the morning should be crushed and pressed the same day. Long intervals or delays in the process from picking the fruit to expressing the oil tends to rancidity. To make perfect oil requires a perfect system in the whole management. The capacity of the press, the crusher, the drier, and the number of pickers should correspond or be about equal; all fruit picked during the day should be in at night, cleaned the following morning, and go into the drier immediately after the previous day's drying is taken out. The heat or temperature of the drier ought to be so graded as to complete the work in forty-eight hours, and it is better that it should be under 130° rather than above. Economy will necessitate in the business a system in the different branches of the process admitting of no delays from the beginning to the end.

My drier has capacity of 500 square feet of surface, and will contain at one time 2000 pounds of olives, equal to five pickers of 400 pounds each per day and as much as the crusher and press I am now using can work.

The almost universal method of crushing the berries is by a heavy stone, similar to a mill stone, which is rolled round on the edge in a deep circular groove or trough, and by its weight does the crushing. A beam passing through the eye of the stone, and working on a journal in the center of the circle with a horse attached to the outer end of the beam, is the simplest way to do the work, and the plan that I have adopted. The circumference of the trough depends somewhat on the size of the stone. The one I am using is four feet high, six inches thick, and the diameter of the trough in which it works, six feet; the length of the beam fifteen feet. This crusher is amply sufficient for an orchard of one thousand trees, but too small for my purpose. It cost about \$50.

A stone five feet in diameter and two feet thick would crush in eight hours a sufficient

quantity of berries to make 100 gallons of oil, and by working it night and day, the crop of ten thousand trees. It would be better, however, to have two stones half the thickness of the above, one following the other in the same groove. The horse should work on the outside of the building containing the crusher.

To make 100 gallons of oil each day would require two good presses. The one best adapted for the purpose as far as I have seen, is that used for making oleomargarine. Such presses could with very little expense be worked by the horse power used for crushing the berries, so that one man could do all the crushing and pressing.

The press I am using is an old-fashioned wooden beam press, such as used in the New England and Middle States for making cider. The beam is 26 feet long, and with a heavy box filled with rock suspended at the extreme end, the power can be increased to 150 tons. The press with the differential pulleys cost about \$150. Such a press cannot be improved upon for expressing the oil, but the additional labor and the time lost in changing is so much greater than what would be required for the oleomargarine invention, that the latter would facilitate the work, and be cheaper in the end, besides taking up so much less room.

The crushed olives are put in the press in cheeses about three feet square, and three inches thick, with wooden slats between each cheese. Ten or more cheeses can be put in at each pressing. I use coarse linen cloth to contain the crushed olives.

The fluid that is expressed is put in large tanks, and left for sixty to ninety days, when the oil will separate, and being lighter will rise to the top, where it can be drawn off. The pomace after the first pressing is re-crushed, and by pouring hot water over it, a second quality of oil is expressed. The refuse can be used either for fuel, for feed for pigs, or for making still a third quality of oil; if for the latter, it is thrown in vats, holling water poured over it, and left to ferment, when the oil still remaining will be liberated and rise to the top.

ELLWOOD COOPER.

MAHOGANY.—The manufacture of mahogany furniture has, perhaps, increased four-fold within the last two years. This increase comes from the demand for high-priced furniture, as well as from the deterioration and scarcity of black walnut. This beautiful wood is now largely being made use of for interior finish—many of the finer houses, banks, insurance offices, etc., being finished with it. Its use is entering rapidly into the construction of rail way carriages—a source of demand uniformly good for hard woods. The chief sources of mahogany are Mexico and the West Indies, and the United States takes 25 to 30 per cent of the whole exports.

About Obtaining Patents.

Patents are Virtually Contracts

Between inventors and the public. The consideration flowing from both parties to the contract is expressly fixed by statute. The Government requires the following consideration in every case: First, that an applicant for a patent shall disclose a new and useful improvement, of which he is the first and original inventor. Second, that the invention has not been patented, or published in a printed publication prior to the date of his invention. Third, that the invention has not been in public use, or on sale, more than two years prior to his application for a patent. Fourth, that the invention shall be properly described and claimed in the specification forming a part of the patent. Provided an inventor complies strictly with these conditions, the Government guarantees that the inventor shall have the exclusive right to make, use and sell the thing invented for the term of seventeen years.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented by another. This requires an exhaustive search among all the patents in the class to which the invention relates. This question can often be answered gratuitously by us, immediately on receiving full information of the invention, by reason of our long and extensive practice as patent solicitors and editors and publishers of first-class, scientific and industrial journals, during the past 20 years and over. When the question of priority of invention is not so readily to be determined, it is generally best to make what is termed a "preliminary examination," by searching through the patent office reports among the patents in the class to which the invention relates, and referring to our extensive patent library, containing compilations of special classes of American and foreign inventions, mechanical dictionaries, scientific encyclopedias, files of scientific and mechanical newspapers, and an immense number of patent applications by inventors of the Pacific coast, carefully filed by this office since 1860.

If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely where his invention has been anticipated, thereby saving him further expense and perhaps much time, useless delay, anxiety, etc.

To avoid all unnecessary delay, however, in securing patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately, and forwarded to the inventor for his signature. When the inventor receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps to be taken.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretence of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give a case up as long as there is a chance to obtain a patent. The Agency charge is from \$25 to \$30, or sometimes more, if the invention is intricate or complicated, or requires much labor. Drawings cost from \$5 upward, according to their number and the time employed, and, if a model is sent, the express charges upon this and the papers must be added. The total cost, in addition to Government fees, rarely exceeds \$40, and for this we do all we can without appealing the case.

When the invention consists of a new article of manufacture, or a new composition, samples of the separate ingredients sufficient to make the experiment and also of the manufactured article itself, must be furnished.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are considered more satisfactory to the Patent Office than the old and more cumbersome system of storing up an immense bulk of almost numberless models.

Drawings or sketches, sufficient to illustrate clearly the invention, with a sufficient description to enable us to make a full set of perfect drawings for the Patent Office is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it for us.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or very poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had the invention been fully portrayed by artistic and skillfully executed drawings. Again, when patents of this character are brought into court, the uncertainty and ambiguity of the drawings enable the opposing experts to mystify the judges as to the construction or combination of parts intended to be covered by the patentee. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken that the invention is fully and clearly shown by different views, so that the improvement will be readily understood by the examiners in the Patent Office, and comprehended by the public when the patent is granted.

In the Patent Office

The application is assigned to the Examiner having charge of the class to which the invention relates. The case must then take its turn with others in the order of filing, and in due time is carefully examined to test the novelty of the in-

vention. If the examiner fails to find anything that anticipates the invention, a patent is immediately allowed, provided the specification and claims are drafted in proper form. Should the Examiner find a prior patent which, in his opinion, anticipates one or more of the claims in the application, a letter of rejection is sent to the attorney in charge of the case; and, if the attorney coincides with the views of the Examiner, the claims rejected are erased. In preparing applications for patents, an attorney should be careful to familiarize himself with the class of inventions to which the application pertains, so that the specification and claims may be drafted as nearly perfect in the first instance as is possible. This course saves much time in prosecuting the application to a patent.

When claims are improperly rejected on patents which do not anticipate the spirit or wording of the claims, proper steps are immediately taken to convince the Examiner of his error. This is done, in most part, by personal arguments, as the differences in construction, operation, function and results are more readily discovered and appreciated by an oral presentation of the facts than can possibly be done by relying solely on written arguments. In order that the Patent Office record of the patents shall be complete, an oral argument is generally supplemented by a manuscript brief, that others, in examining the files at any future time, may clearly comprehend the position taken by the Examiner and attorney in prosecuting the case to a patent.

In addition to our own personal attention to the interest of our clients here, we have, for over 12 years past, had constantly in association with us in Washington, one of the soundest legal counselors and ablest of practitioners in patent business in this country, who carefully attends in person to our business at the Patent Office, and has attained success in a most marked degree.

Perfect Claims.

The value and force of a patent are dependent on its claims. A patent may disclose to the public the most important and valuable invention, and yet the claim be of such meager scope that the patent is actually worthless. When the claims of a patent are so loosely drafted that infringers can flood the market with improvements, differing from the improvement disclosed by the patent only in slight changes in construction and arrangements of parts, such a patent is valueless to the owner, as it fails to afford him that exclusive and complete protection guaranteed by the Patent Law. Hence it is that the greatest care skill and perseverance are required, first, in properly drafting the claims in the first instance, and second, in prosecuting the application before the Patent Office, and maintaining the rights of the inventor to claims as broad and sweeping as the invention will warrant. This latter is no easy task. The Examiners of the Patent Office serve in the capacity of attorneys guarding the interests of the public. It is their sworn duty to exercise the greatest care and watchfulness, that patentees do not secure claims of greater scope than they are justly entitled to. It is but natural that Examiners are sometimes in error as to just what scope should be accorded an invention. Although the Examiners act under honest convictions in cases where they refuse an inventor his just rights, yet it is the duty of the attorney to maintain the claims of his client, if he is convinced that they are just and proper. To succeed in this requires the display of tact, firmness and ability; and when the Examiner is made to see that the inventor is honestly and fairly entitled to the claims which have been rejected, he will almost invariably recede from his former action, and allow the case.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. (continuously editors and publishers of the MINING AND SCIENTIFIC PRESS, nearly from its early commencement in 1860) offer comparatively far better facilities to the local inventors of the Pacific States and Territories than are possessed by any other agents in America. Members of the firm give personal attention to the applications entrusted to their care. They have been longer in practice in patent soliciting than most agents who are still personally engaged in the business. They have secured more U. S. and foreign patents in the past 20 years (with very few exceptions) than any other firm still existing. Their practice has been so successful and long continued, that the great majority of inventions on this side of the American continent have been patented through their agency, thus affording them great and valuable experience, by thorough information of the true principles and points of novelty in the inventions, whether general in character or peculiarly local to this coast.

The extensive business combination and experience of this firm, is undoubtedly one of the most fortunate in existence for affording inventors prompt and reliable advice, and the best possible facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation that is best calculated to widely inform the class of readers most specially interested in the subject of his invention.

Saving of Time, Etc.

Inventors on this coast will find that owing to our familiarity with inventions and local affairs of this coast, we can more readily and fully comprehend their wants, and thus save much of the time ordinarily consumed in preliminary writing back and forth when distant agencies are employed.

Caveats.

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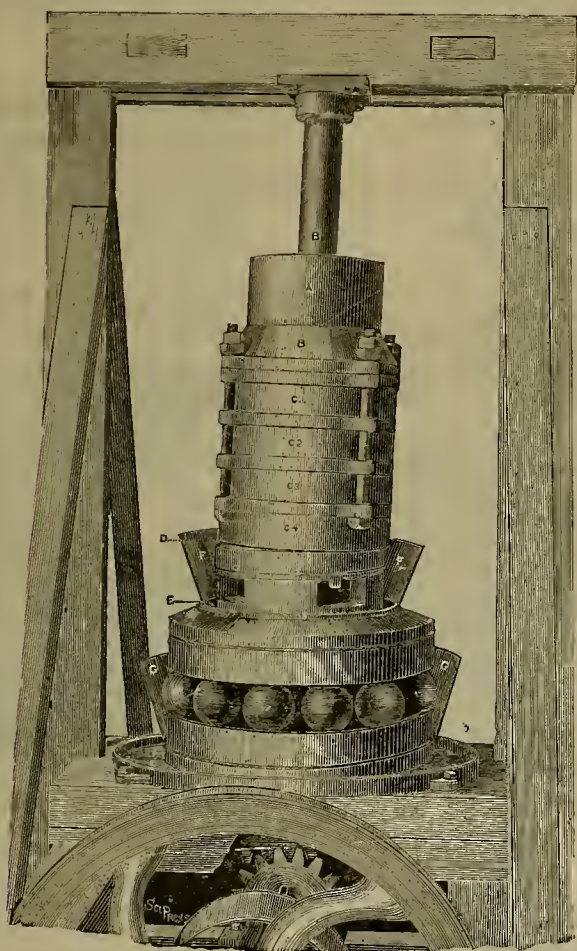
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Ingersoll, D2 3", beat Rand 3 1/2".....	.744	" "
Ingersoll, D2 3", beat National 3 1/2".....	.505	" "
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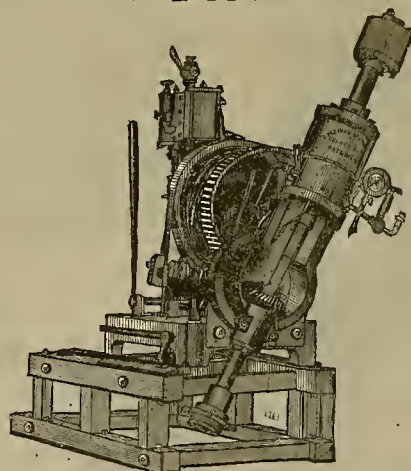
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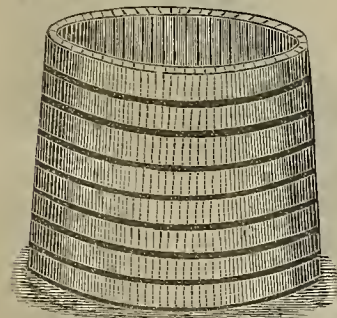
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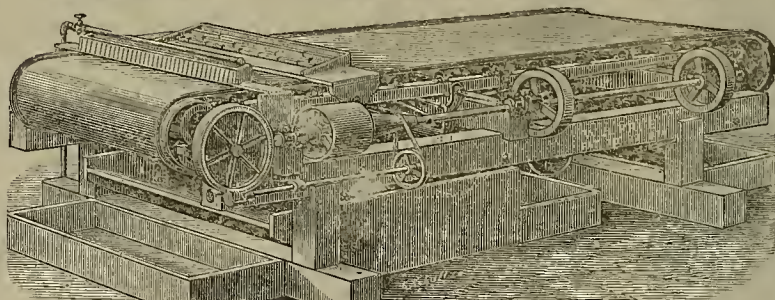
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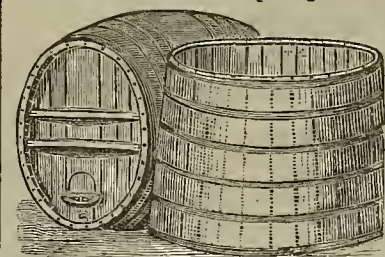
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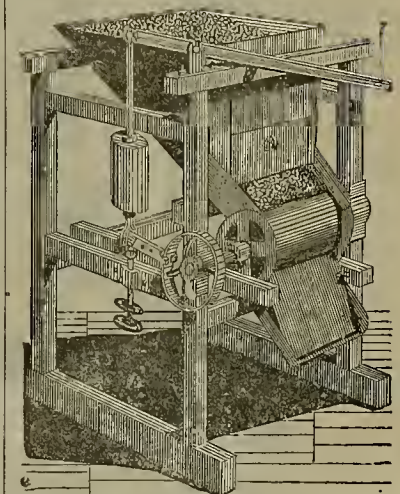
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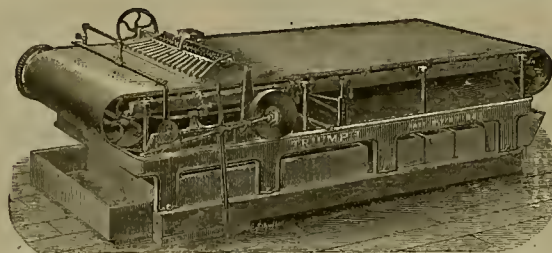
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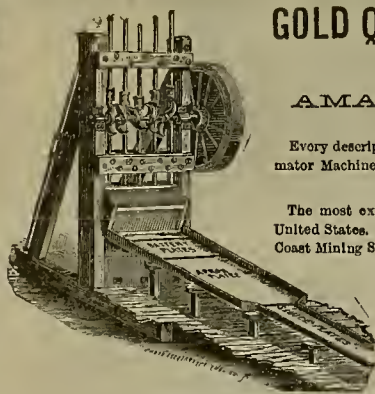
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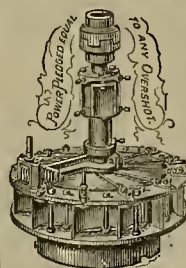
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List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

- FOR WEEK ENDING JANUARY 1, 1884.
- 291,462.—FUME CONDENSER—E. M. Alderman, Tucson, A. T.
 - 291,176.—FIRE-PROOF COMPOUND—L. Feldin, S. F.
 - 291,340.—WATER MOTOR—A. C. Harvey, Lone Pine, Cal.
 - 291,102.—SUPPORT FOR BEAMS AND GIRDERS—P. H. Jackson, S. F.
 - 291,373.—FINGER RING GAUGE—F. D. McDowell, Salem, Or.
 - 291,302.—LOCKING LATCH—E. Nyswonger, Hanford, Cal.
 - 291,434.—KEY FASTENER—E. W. Wagner, Cherokee, Cal.
 - 291,250.—PUMP—A. W. White, San Jose, Cal.
 - 291,254.—WINDOW BLIND—Jos. Williams, San Jose, Cal.
 - 291,121.—FORCE PUMP—H. M. Wyeth, Salt Lake, U. T.
 - 10,832.—TRADE MARK—Siebe Bros. and Plagemann, S. F.

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Mining Share Market.

The market for mining shares remains in about the same state as for some time past, there having been no bonanzas of late to give it any strength. If there is any change at all, however, it has been a little for the better, perhaps. The long interval which has elapsed since a rich strike was made on the Comstock has discouraged many, but the miners up there are still hard at work in a hopeful manner.

The season of inactivity is about over, and the time is drawing near when something decisive must be done in one direction or another. This is particularly the case at the north end, south end and middle mines.

At the north end the Sierra Nevada folks are again going ahead with their northeast drift, and find that the quartz in the face is widening and improving. As this drift advances it will cut the rich ore streaks encountered in the joint Union Consolidated cross-cut, which was run out east a distance of twenty-eight feet. The last streak cut in this drift was eight inches thick, and rich in gold. In about five weeks the north and south drifts in the Union Con. will be connected, forming an air gallery which will constitute a base of operations for all the north end mines. Then real square prospecting may be done.

At Gold Hill the Yellow Jacket and other companies are taking out as much ore as the mills on the Carson river can handle, and in addition all are doing more or less work in the way of prospecting. Once there is a good stage of water in the river, the Gold Hill mining companies will enter upon a prosperous season.

At the middle mines all is now going on very satisfactorily. The new hydraulic pump is all that could be desired, and all operations may now proceed without the least fear of being flooded out by water. The combination shaft will be put down to the 2800 level as speedily as possible, and from that point a drift will be run west to connect with the Hale & Norcross.

If you want a lubricant that will run any thing cool write CHARLES J. WOODBURY, GENERAL MANAGER LUBRICATING DEPARTMENT CONTINENTAL OIL AND TRANS. CO., for "Lubricoil." It is the best compound grease in the market. Shipped in 5, 10 and 25-pound cans, half barrels and barrels. Warranted to give satisfaction. Observe the numbers: No. 3 is soft for outside work; No. 5 is medium soft; No. 4 is medium hard; No. 5 is very hard, where unusual lubrication is demanded. Send for Catalogue of Lubricating Oils.

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San Francisco Metal Market.

THURSDAY, Jan. 17, 1884.

ANTIMONY—Per pound.	14 @	5
IRON—American Pig, soft, ton.	30 @	—
Scotch Pig, ton.	24 @	28 50
American White Pig, ton.	28 @	32 50
Oregon Pig, ton.	— @	—
Clippers Cap, Nos. 1 to 4.	32 @	35 00
Refined Bar.	34 @	—
Horseshoes, keg.	5 @	60
Nail Rod.	4 @	—
Norway, according to thickness.	6 @	7
TELE—English Cast, lb.	14 @	15
Black Diamond, ordinary sizes.	14 @	—
Machinery.	15 @	16
COPPER—Ingot.	22 @	—
Brass—sized.	31 @	—
Fire-box sheets.	31 @	—
Nails.	17 @	—
Bolt.	31 @	—
Old.	8 @	—
Bar.	— @	—
Cement, 100 fine.	12 @	—
LEAD—Pig.	4 @	—
Pipe.	7 @	—
Sheet.	8 @	—
Shot, discount 10% on 500 bag: Drop, P. bag.	2 @	10
Shot, 3 bag.	3 @	4 75
Chilled, do.	2 @	50
TIN PLATES—Charcoal.	6 @	60
Coke.	5 @	5 75
Bacon.	24 @	—
Australian.	24 @	—
L. C. Charcoal Roofing, 14x20.	6 @	60
ZINC—By the cask.	19 @	—
Sheet, 7x3 ft. 7 to 10 lb. less the cask.	9 @	10
Chilled—Assorted sizes.	3 @	4 75
FLAT—By the cask.	34 @	34
Planks, new.	1 @	50
Planks, old.	85 @	—

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con. M. Co.	Nevada.	17.	50, Jan 5.	W. Willis.	309 Montgomery st
Aultman M. & M. Co.	California.	1.	2, Dec 22.	J. M. Buffington.	309 California st
Acme M. Co.	California.	7.	8, Dec 22.	J. M. Buffington.	309 California st
Baker Divide M. Co.	California.	8.	20, Dec 22.	W. G. Hughes.	330 Pine st
Bodie Con. M. Co.	California.	4.	50, Dec 21.	W. G. Sessions.	309 Montgomery st
Belle Isle M. Co.	Nevada.	6.	15, Jan 3.	J. W. Pew.	310 Pine st
California M. Co.	Nevada.	10.	20, Jan 4.	C. P. Gordon.	309 Montgomery st
Copperopolis M. Co.	Arizona.	1.	5, Jan 2.	J. H. Sayre.	330 Pine st
Calaveras M. Co.	Mexico.	8.	10, Jan 9.	W. J. Taylor.	220 Sansome st
Day S. M. Co.	Nevada.	14.	30, Dec 1.	E. M. Hall.	327 Pine st
Eastern Quicksilver M. Co.	California.	2.	10, Dec 7.	F. A. Berlin.	420 Montgomery st
El Dorado Con. M. Co.	Nevada.	1.	05, Dec 4.	J. H. Sayre.	330 Pine st
Eintracht Gravel M. Co.	California.	14.	5, Jan 8.	H. Kunz.	209 Sansome st
Eureka Con. M. Co.	Nevada.	7.	1,00, Jan 15.	E. H. Wilson.	783 Folsom st
Golden Fleece M. Co.	California.	31.	30, Dec 12.	F. Schirmer.	309 California st
Goodshaw M. Co.	California.	15.	10, Jan 13.	C. C. Harvey.	309 California st
Hale & Norcross M. Co.	Nevada.	80.	50, Jan 15.	J. F. Lightner.	309 Montgomery st
Holmes M. Co.	Nevada.	8.	1,00, Dec 26.	C. T. Bridge.	224 California st
Independence M. Co.	Nevada.	12.	20, Dec 2.	J. W. Pew.	414 California st
Jupiter Deep Blue Gravel M. Co.	Cal.	1.	1,00, Dec 17.	G. Lande.	426 California st
Julia Con. M. Co.	Nevada.	19.	10, Jan 3.	H. A. Charles.	419 California st
Lorato M. and M. Co.	Mexico.	5.	50, Dec 5.	H. G. Jones.	327 Pine st
Mayflower Gravel M. Co.	California.	22.	10, Jan 5.	J. Morizo.	328 Montgomery st
Massachusetts Con. M. Co.	Nevada.	25.	10, Dec 4.	A. C. Hammond.	Merchants Ex.
Mammoth Bar M. Co.	California.	4.	15, Jan 14.	J. W. Pew.	310 Pine st
Mexican G. M. Co.	Nevada.	25.	50, Dec 26.	C. E. Elliott.	309 Montgomery st
Martin White M. Co.	Nevada.	17.	25, Dec 24.	J. J. Seville.	309 Montgomery st
Menstrual M. Co.	California.	1.	10, Jan 14.	R. Wegener.	414 California st
Northern Belle.	Nevada.	7.	50, Nov 30.	J. W. Willis.	309 Montgomery st
North Belle Isle M. Co.	Nevada.	7.	10, Jan 3.	J. W. Pew.	310 Pine st
Original Keystone M. Co.	Arizona.	5.	30, Nov 21.	F. E. Lutz.	330 Pine st
Pinal Con. M. Co.	California.	5.	10, Dec 15.	A. Adler.	309 Montgomery st
Percheron Blue Gravel M. Co.	Nevada.	1.	20, Jan 5.	G. C. Pratt.	414 California st
Rainbow M. Co.	California.	9.	20, Jan 3.	J. S. Jordan.	311 Montgomery st
Santa Anita M. Co.	California.	6.	1, Dec 22.	J. M. Cuffington.	309 California st
Tohono M. Co.	California.	1.	30, Dec 18.	J. L. Fields.	330 Pine st
Utah S. M. Co.	Nevada.	47.	1,00, Jan 4.	J. M. Cuffington.	309 Montgomery st
Union Con. M. Co.	Nevada.	25.	10, Dec 4.	J. M. Cuffington.	309 California st
Wide Awake M. Co.	Arizona.	17.	20, Nov 17.	C. Hildebrandt.	320 Sansome st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Crescent M. Co.	Nevada.	T. J. Shackelford.	418 Pine st.	Annual.	Jan 21
Genesee Valley M. Co.	California.	J. Stadfeld, Jr.	419 California st.	Annual.	Jan 22
Head Center M. Co.	Arizona.	J. W. Pew.	310 Pine st.	Annual.	Jan 24
Wide Awake M. Co.	Nevada.	C. H. Hildebrandt.	320 Sansome st.	Annual.	Feb 13

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M. Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Jan 15
Bulwer Con. M. Co.	California.	W. Willis.	309 Montgomery st.	10.	Jan 23
Contention Con. M. Co.	Arizona.	D. C. Bates.	309 Montgomery st.	25.	Jan 12
Standard Blue Gravel M. Co.	California.	T. Wetzel.	522 Montgomery st.	4.	Jan 4
Idaho M. Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Dec 2
Jackson M. Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Jan 4
Kentuck M. Co.	Nevada.	J. W. Pew.	310 Pine st.	10.	Jan 5
McDiarmid M. Co.	Nevada.	R. W. Heath.	318 Pine st.	25.	Nov 26
Union Con. M. Co.	Nevada.	W. Willis.	309 Montgomery st.	25.	Jan 25
Silver King M. Co.	Arizona.	J. Nash.	315 California st.	25.	Dec 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 26.	WEEK ENDING Jan. 2.	WEEK ENDING Jan. 9.	WEEK ENDING Jan. 16.
Alpha.....	1.00	1.35	1.15	1.35
Alta.....	1.20	1.40	1.05	1.30
Andes.....	.45	.50	.40	.75
Argenta.....	.45	.50	.40	.75
Atlas.....	.45	.50	.40	.75
Belcher.....	.90	.95	1.00	1.20
Belding.....	.90	.95	1.00	1.20
Best & Belcher.....	2.25	3.05	2.60	3.00
Bullion.....	.55	.60	.60	.70
Bechtel.....	.20	.25	.25	.30
Belle Isle.....	.25	.20	.05	.15
Bodie Con.....	.75	1.00	.85	1.10
Benton.....	.20	.25	.25	.30
Bodie Tunnel.....	.10	.15	.15	.20
Caledonia.....	.10	.15	.15	.20
California.....	.10	.15	.15	.20
Challenge.....	2.25	2.65	2.50	2.75
Chollar.....	2.25	2.65	2.50	2.75
Confidence.....	1.00	1.00	1.00	1.10
Con. Imperial.....	.25	.35	.30	.35
Con. Virginia.....	.25	.35	.30	.35
Crown Point.....	.20	.20	.20	.25
Day.....	.20	.20	.20	.25
Elko Con.....	.20	.20	.20	.25
Eureka Con.....	2.25	2.60	2.25	2.60
Eureka Tunnel.....	.50	.55	.55	.60
Excelsior.....	.30	.35	.30	.35
Grand Prize.....	.20	.25	.20	.25
Gould & Curry.....	1.60	1.95	1.70	2.05
Hale & Norcross.....	1.60	2.05	2.10	2.50
Independence.....	.50	.55	.50	.55
Julia.....	.25	.35	.30	.35
Justice.....	.25	.35	.30	.35
Martin White.....	.20	.25	.20	.25
Mexican.....	2.00	2.35	2.15	2.50
N. D. Diablo.....	7.25	1.75	1.90	2.00
No. 5.....	2.00	2.00	2.00	2.00
No. 10.....	2.00	2.00	2.00	2.00
No. 15.....	2.00	2.00	2.00	2.00
No. 20.....	2.00	2.00	2.00	2.00
No. 25.....	2.00	2.00	2.00	2.00
No. 30.....	2.00	2.00	2.00	2.00
No. 35.....	2.00	2.00	2.00	2.00
No. 40.....	2.00	2.00	2.00	2.00
No. 45.....	2.00	2.00	2.00	2.00
No. 50.....	2.00	2.00	2.00	2.00
No. 55.....	2.00	2.00	2.00	2.00
No. 60.....	2.00	2.00	2.00	2.00
No. 65.....	2.00	2.00	2.00	2.00
No. 70.....	2.00	2.00	2.00	2.00
No. 75.....	2.00	2.00	2.00	2.00
No. 80.....	2.00	2.00	2.00	2.00
No. 85.....	2.00	2.00	2.00	2.00
No. 90.....	2.00	2.00	2.00	2.00
No. 95.....	2.00	2.00	2.00	2.00
No. 100.....	2.00	2.00	2.00	2.00
No. 105.....	2.00	2.00	2.00	2.00
No. 110.....	2.00	2.00	2.00	2.00
No. 115.....	2.00	2.00	2.00	2.00
No. 120.....	2.00	2.00	2.00	2.00
No. 125.....	2.00	2.00	2.00	2.00
No. 130.....	2.00	2.00	2.00	2.00
No. 135.....	2.00	2.00	2.00	2.00
No. 140.....	2.00	2.00	2.00	2.00
No. 145.....	2.00	2.00	2.00	2.00
No. 150.....	2.00	2.00	2.00	2.00
No. 155.....	2.00	2.00	2.00	2.00
No. 160.....	2.00	2.00	2.00	2.00
No. 165.....	2.00	2.00	2.00	2.00
No. 170.....	2.00	2.00	2.00	2.00
No. 175.....	2.00	2.00	2.00	2.00
No. 180.....	2.00	2.00	2.00	2.00
No. 185.....	2.00	2.00	2.00	2.00
No. 190.....	2.00	2.00	2.00	2.00
No. 195.....	2.00	2.00	2.00	2.00
No. 200.....	2.00	2.00	2.00	2.00
No. 205.....	2.00	2.00	2.00	2.00
No. 210.....	2.00	2.00	2.00	2.00
No. 215.....	2.00	2.00	2.00	2.00
No. 220.....	2.00	2.00	2.00	2.00
No. 225.....	2.00	2.00	2.00	2.00
No. 230.....	2.00	2.00	2.00	2.00
No. 235.....	2.00	2.00	2.00	2.00
No. 240.....	2.00	2.00	2.00	2.00
No. 245.....	2.00	2.00	2.00	2.00
No. 250.....	2.00	2.00	2.00	2.00
No. 255.....	2.00	2.00	2.00	2.00
No. 260.....	2.00	2.00	2.00	2.00
No. 265.....	2.00	2.00	2.00	2.00
No. 270.....	2.00	2.00	2.00	2.00
No. 275.....	2.00	2.00	2.00	2.00
No. 280.....	2.00	2.00	2.00	2.00
No. 285.....	2.00	2.00	2.00	2.00
No. 290.....	2.00	2.00	2.00	2.00
No. 295.....	2.00	2.00	2.00	2.00
No. 300.....	2.00	2.00	2.00	2.00
No. 305.....	2.00	2.00	2.00	2.00
No. 310.....	2.00	2.00	2.00	2.00
No. 315.....	2.00	2.00	2.00	2.00
No. 320.....	2.00	2.00	2.00	2.00
No. 325.....	2.00	2.00	2.00	2.00
No. 330.....	2.00	2.00	2.00	2.00
No. 335.....	2.00	2.00	2.00	2.00
No. 340.....	2.00	2.00	2.00	2.00
No. 345.....	2.00	2.00	2.00	2.00
No. 350.....	2.00	2.00	2.00	2.00
No. 355.....	2.00	2.00	2.00	2.00
No. 360.....	2.00	2.00	2.00	2.00
No. 365.....	2.00	2.00	2.00	2.00
No. 370.....	2.00	2.00	2.00	2.00
No. 375.....	2.00	2.00	2.00	2.00
No. 380.....	2.00	2.00	2.00	2.00
No. 385.....	2.00	2.00	2.00	2.00
No. 390.....	2.00	2.00	2.00	2.00
No. 395.....	2.00	2.00	2.00	2.00
No. 400.....	2.00	2.00	2.00	2.00
No. 405.....	2.00	2.00	2.00	2.00
No. 410.....	2.00	2.00	2.00	2.00
No. 415.....	2.00	2.00	2.00	2.00
No. 420.....	2.00	2.00	2.00	2.00
No. 425.....	2.00	2.00	2.00	2.00
No. 430.....	2.00	2.00	2.00	2.00
No. 435.....	2.00	2.00	2.00	2.00
No. 440.....	2.00	2.00	2.00	2.00
No. 445.....	2.00	2.00	2.00	2.00
No. 450.....	2.00	2.00	2.00	2.00
No. 455.....	2.00	2.00	2.00	2.00
No. 460.....	2.00	2.00	2.00	2.00
No. 465.....	2.00	2.00	2.00	2.00
No. 470.....	2.00	2.00	2.00	2.00
No. 475.....	2.00	2.00	2.00	2.00
No. 480.....	2.00	2.00	2.00	2.00
No. 485.....	2.00	2.00	2.00	2.00
No. 490.....	2.00	2.00	2.00	2.00
No. 495.....	2.00	2.00	2.00	2.00
No. 500.....	2.00	2.00	2.00	2.00
No. 505.....	2.00	2.00	2.00	2.00
No. 510.....	2.00	2.00	2.00	2.00
No. 515.....	2.00	2.00	2.00	2.00
No. 520.....	2.00	2.00	2.00	2.00
No. 525.....	2.00	2.00	2.00	2.00
No. 530.....	2.00	2.00	2.00	2.00
No. 535.....	2.00	2.00	2.00	2.00
No. 540.....	2.00	2.00	2.00	2.00
No. 545.....	2.00	2.00	2.00	2.00
No. 550.....	2.00	2.00	2.00	2.00
No. 555.....	2.00	2.00	2.00	2.00
No. 560.....	2.00	2.00	2.00	2.00
No. 565.....	2.00	2.00	2.00	2.00
No. 570.....	2.00	2.00	2.00	2.00
No. 575.....	2.00	2.00	2.00	2.00
No. 580.....	2.00	2.00	2.00	2.00
No. 585.....	2.00	2.00	2.00	2.00
No. 590.....	2.00	2.00	2.00	2.00
No. 595.....	2.00	2.00	2.00	2.00
No. 600.....	2.00	2.00	2.00	2.00
No. 605.....	2.00	2.00	2.00	2.00
No. 610.....	2.00	2.00	2.00	2.00
No. 615.....	2.00	2.00	2.00	2.00
No. 620.....	2.00	2.00	2.00	2.00
No. 625.....	2.00	2.00	2.00	2.00
No. 630.....	2.00	2.00	2.00	2.00
No. 635.....	2.00	2.00	2.00	2.00
No. 640.....	2.00	2.00	2.00	2.00
No. 645.....	2.00	2.00	2.00	2.00
No. 650.....	2.00	2.00	2.00	2.00
No. 655.....	2.00	2.00	2.00	2.00
No. 660.....	2.00	2.00	2.00	2.00
No. 665.....	2.00	2.00	2.00	2.00
No. 670.....	2.00	2.00	2.00	2.00
No. 675.....	2.00	2.00	2.00	2.00
No. 680.....	2.00	2.00	2.00	2.00
No. 685.....	2.00	2.00	2.00	2.00
No. 690.....	2.00	2.00	2.00	2.00
No. 695.....	2.00	2.00	2.00	2.00
No. 700.....	2.00	2.00	2.00	2.00
No. 705.....	2.00	2.00	2.00	2.00
No. 710.....	2.00	2.00	2.00	2.00
No. 715.....	2.00	2.00	2.00	2.00
No. 720.....	2.00	2.00	2.00	2.00
No. 725.....	2.00	2.00	2.00	2.00
No. 730.....	2.00	2.00	2.00	2.00
No. 735.....	2.00	2.00	2.00	2.00
No. 740.....	2.00	2.00	2.00	2.00
No. 745.....	2.00	2.00	2.00	2.00
No. 750.....	2.00	2.00	2.00	2.00
No. 755.....	2.00	2.00	2.00	2.00
No. 760.....	2.00	2.00	2.00	2.00
No. 765.....	2.00	2.00	2.00	2.00
No. 770.....	2.00	2.00	2.00	2.00
No. 775.....	2.00	2.00	2.00	2.00
No. 780.....	2.00	2.00	2.00	2.00
No. 785.....	2.00	2.00	2.00	2.00
No. 790.....	2.00	2.00	2.00	2.00
No. 795.....	2.00	2.00	2.00	2.00
No. 800.....	2.00	2.00	2.00	2.00
No. 805.....	2.00	2.00	2.00	2.00
No. 810.....	2.00	2.00	2.00	2.00
No. 815.....	2.00	2.00	2.00	2.00
No. 820.....	2.00	2.00	2.00	2.00
No. 825.....	2.00	2.00	2.00	2.00
No. 830.....	2.00	2.00	2.00	2.00
No. 835.....	2.00	2.00	2.00	2.00
No. 840.....	2.00	2.00	2.00	2.00
No. 845.....	2.00	2.00	2.00	2.00
No. 850.....	2.00	2.00	2.00	2.00
No. 855.....	2.00	2.00	2.00	2.00
No. 860.....	2.00	2.00	2.00	2.00
No. 865.....	2.00	2.00	2.00	2.00
No. 870.....	2.00	2.00	2.00	2.00
No. 875.....	2.00	2.00	2.00	2.00
No. 880.....	2.00	2.00	2.00	2.00
No. 885.....	2.00	2.00	2.00	2.00
No. 890.....	2.00	2.00	2.00	2.00
No. 895.....	2.00	2.00	2.00	2.00
No. 900.....	2.00	2.00	2.00	2.00
No. 905.....	2.00	2.00	2.00	2.00
No. 910.....	2.00	2.00	2.00	2.00
No. 915.....	2.00	2.00	2.00	2.00
No. 920.....	2.00	2.00	2.00	2.00
No. 925.....	2.00	2.00	2.00	2.00
No. 930.....	2.00	2.00	2.00	2.00
No. 935.....	2.00	2.00	2.00	2.00
No. 940.....	2.00	2.00	2.00	2.00
No. 945.....	2.00	2.00	2.00	2.00
No. 950.....	2.00	2.00	2.00	2.00
No. 955.....	2.00	2.00	2.00	2.00
No. 960.....	2.00	2.00	2.00	2.00
No. 965.....	2.00	2.00	2.00	2.00
No. 970.....	2.00	2.00	2.00	2.00
No. 975.....	2.00	2.00	2.00	2.00
No. 980.....	2.00	2.00	2.00	2.00
No. 985.....	2.00	2.00	2.00	2.00
No. 990.....	2.00	2.00	2.00	2.00
No. 995.....	2.00	2.00	2.00	2.00
No. 1000.....	2.00	2.00	2.00	2.00
No. 1005.....	2.00	2.00	2.00	2.00
No. 1010.....	2.00	2.00	2.00	2.00
No. 1015.....	2.00	2.00	2.00	2.00
No. 1020.....	2.00	2.00	2.00	2.00
No. 1025.....	2.00	2.00	2.00	2.00
No. 1030.....	2.00	2.00	2.00	2.00
No. 1035.....	2.00	2.00	2.00	2.00
No. 1040.....	2.00	2.00	2.00	2.00
No. 1045.....	2.00	2.00	2.00	2.00
No. 1050.....	2.00	2.00	2.00	2.00
No. 1055.....	2.00	2.00	2.00	2.00
No. 1060.....</				

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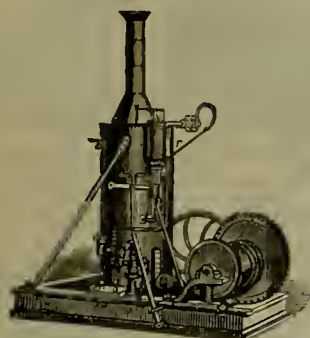
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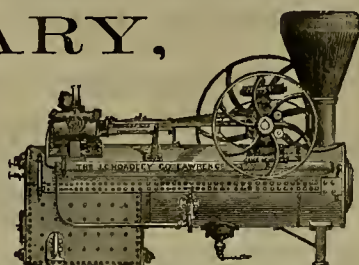


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SAN FRANCISCO, Dec. 27, 1883.

Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR—The four-foot Centrifugal Roller Mill, bought of you in August, 1882, for the Whidden Gold Mining Company, of Shingle Springs, has given entire satisfaction, both on our own and on custom work, saving from 85 to 90 per cent. of the gold in the mill. In conclusion I will say that we are so well pleased with it that Mr. Whidden and myself are putting one of the same size on the Tohongo gold mine, near Ravenna, in Los Angeles county.

Yours truly, P. YEASEY,
34 California St., S. F.

FINE GOLD GULCH, Nov. 10, 1883.

Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR—In reply to your inquiry concerning the working of your Centrifugal Roller Quartz Mill, I am pleased to say that I run one of them for seven months, doing custom work on different varieties of rock, and that the mill gave satisfaction in every respect, and did all that you claim for it.

Yours truly, BYRON JENNINGS.

GARIBALDI MINE, Dec. 17, 1883.

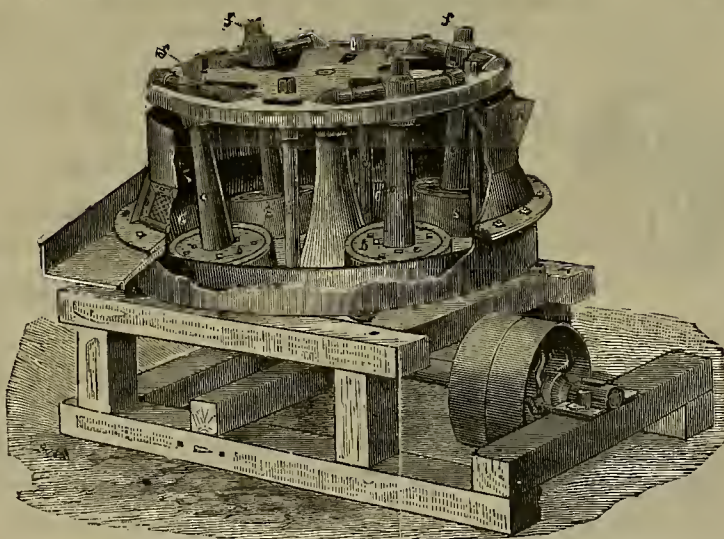
F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—In reply to yours of the 10th inst. I take pleasure in assuring you that your Centrifugal Roller Quartz Mill gives entire satisfaction, and I can heartily recommend it to mining men who want a cheap and efficient crusher.

Yours truly, E. I. PARSONS, Supt.

32 WASHINGTON AVENUE,
SAN FRANCISCO, Dec. 29, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR: Having run one of your Centrifugal Roller Quartz Mills on sample lots of rock from more than twenty different mines, I must say that in every instance it has given the best of satisfaction in every particular; and I recognize its superiority over any other mill manufactured. Very truly yours,

D. O. MOWRY.



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The work done by the Centrifugal Roller Quartz Mill, during the past two years, on various mines and different kinds of rock, PROVE ALL THAT IS CLAIMED FOR IT.

After running one of these mills on the Whidden mine, in El Dorado County, over four months, and thoroughly testing its capacity and durability, I am prepared to offer it to the mining public, and claim for it the following advantages over the drop-stamp mill.

1. The cost of same capacity is not more than one-half that of stamps.
2. Freight to mine one-fourth that of stamps.
3. Cost of erection at mine one-tenth that of stamps.
4. It runs with one-third the power per ton of ore crushed.
5. The wear is less than that of stamps.
6. The wearing parts are easily duplicated.
7. It has a much better discharge, and leaves the pulp in better condition for concentrating.
8. It is a better amalgamator, saving fully nine-tenths of the gold in the mill; the balance can be saved on plates in the usual manner.
9. It is continually crushing; not like the stamp, using power to suspend it in air ninety-nine one-hundredths of the time and the balance making a thundering noise, and accomplishing comparatively small results. It is as far in advance of the stamp mill as the present method of making flour with improved rolls is over the Indian's mode of crushing corn in a stone mortar.

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F. A. Huntington Esq., San Francisco, Cal.—
DEAR SIR—In reply to yours of recent date, inquiring about the Centrifugal Mill which I bought of you, I will say that I have run the mill four months on hard rock; and I take pleasure in adding that the mill has in every way given the best of satisfaction.

Yours truly, J. H. NEALE

GARIBALDI MINE,
Calaveras Co., Cal., Dec. 17, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—In answer to your inquiry concerning the working of the five feet Centrifugal Mill, bought of you for the Garibaldi Mine in Calaveras county, I take pleasure in saying it gives entire satisfaction in every respect, and I only regret that the mine does not warrant the purchase of more of them and the continued use of the one now in operation.

Very truly yours, O. B. SMITH.

F. A. Huntington Esq., San Francisco, Cal.—
DEAR SIR—Your Centrifugal Roller Quartz Mill has run on the Whidden Gold Mining Co. property at Shingle Springs, El Dorado Co., Cal., about four months, and it has done good and satisfactory work, a greater proportion of gold remaining in the mill than in the stamp battery.

FRED JONES, Supt.

HILBRETH RANCH, Fresno Co., Cal.,
January 11, 1884.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR: In regard to your mill (Centrifugal Roller), I have crushed about 500 tons of rock in the mill, and am glad to say that it has given entire satisfaction, and can recommend it to the public as the most expeditious and least expensive method for crushing and milling ore that I have ever seen. Truly yours

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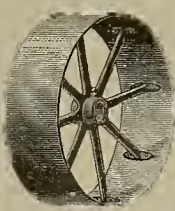
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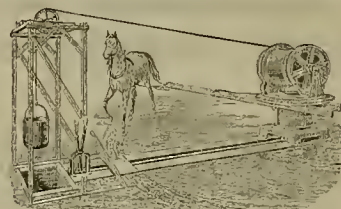
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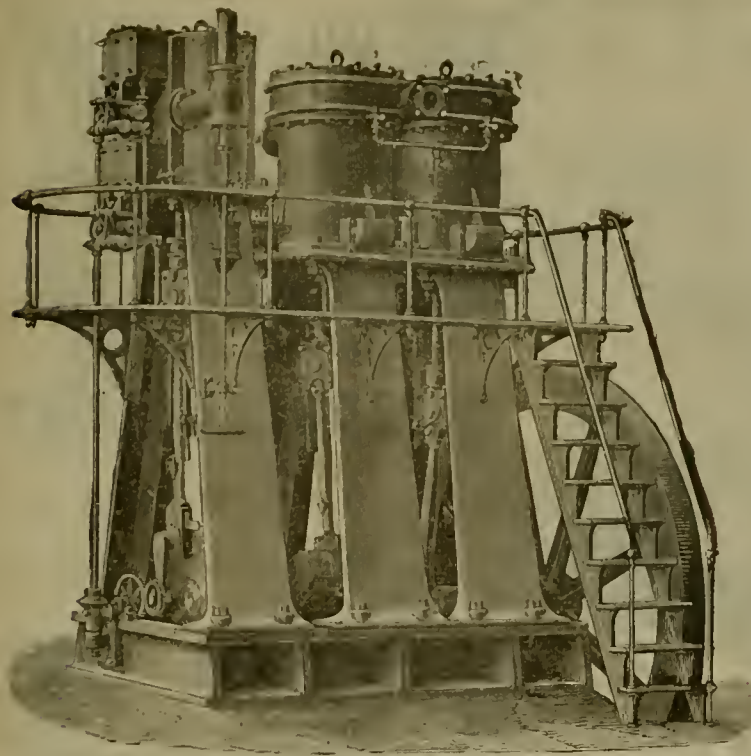
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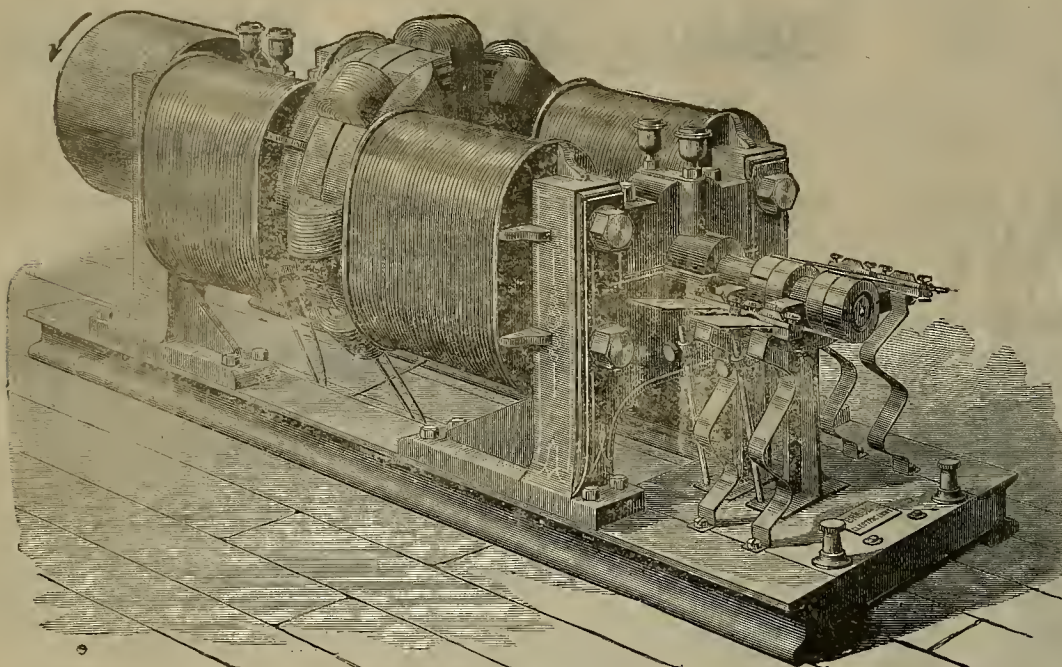
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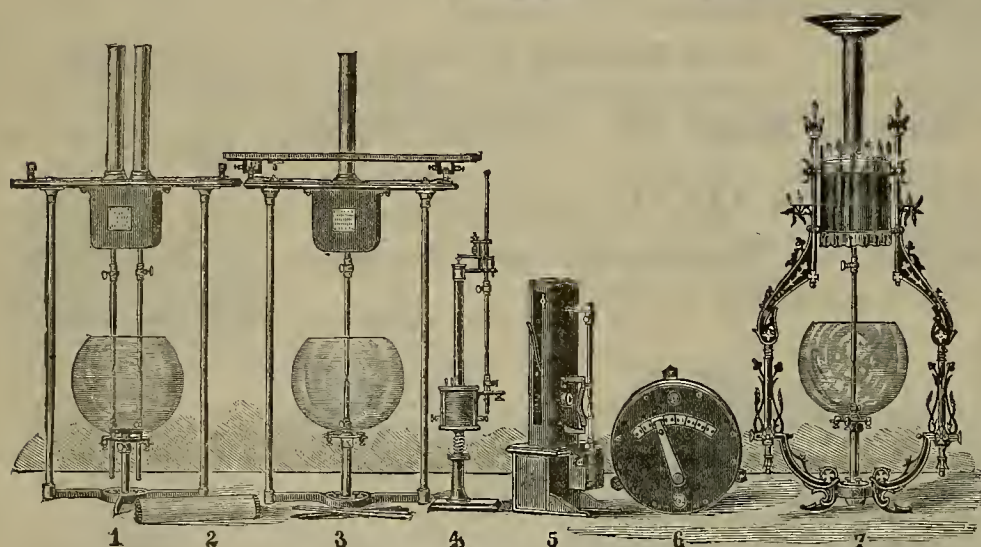
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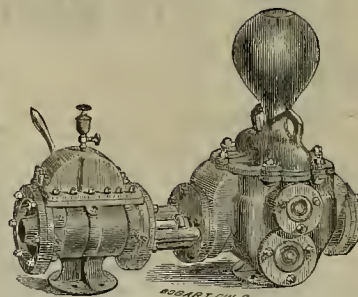
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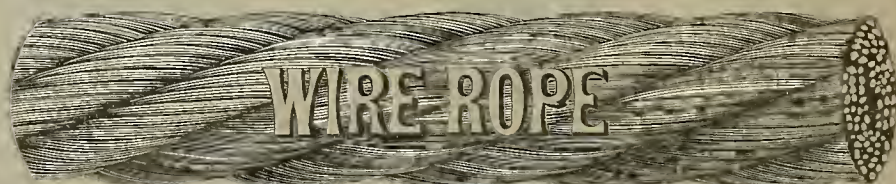
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New Concentrator and Amalgamator.

George R. Evans, of this city, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency a new form of concentrator and amalgamator, the interest in which has been assigned to J. P. Couch and Wm. T. Oneale. The appliance consists of a sluice box or trough having its bottom formed into peculiar curves or rilles, over which is fitted an amalgamated metallic surface. The bottom of the sluice may be of wood or metal. The upper surface is formed in a series of flat and curved surfaces, on which the amalgamated plate (corresponding in form) is placed. The first portion of each section is made flat, and the sluice is set at such an angle that while it declines from the receiving to the discharge end these surfaces will be nearly or quite level.

Continuing from the edge of the level space, the surface makes a concave sweep so as to form a long, shallow curve, and from the termination of this the surface rises into a convex curve, which extends down and terminates abruptly and nearly vertically upon the next plane surface. In this manner a succession of these surfaces is formed, which continue to the end of the sluice. As stated, the surface described is covered with amalgamation plates of corresponding form.

The pulp, tailings, or other material being admitted to the sluice with a sufficient amount of water, falls upon the first plane surface, where the gold and heavier particles sink to the bottom, and the flow is retarded because the surface is level. From this the flow increases through the concave portion, and this forms a sort of rille in which there is a forward current upon the top and an eddy or return current at the bottom, which throws the fine gold back upon the first part of the curve, where the greater portion will be found amalgamated.

The coarser and heavier portions will be detained and amalgamated in the lower part of the curve, while the lighter portions will flow over the convex portion and fall nearly vertically upon the succeeding plane surface, this latter action projecting the heavier particles at once to the bottom and in contact with the amalgamated surface. This action is then continued through as many series as the length of the sluice will admit, and the inventor claims results in a very perfect concentration and amalgamation.

DESERTED DITCHES.—An effect of the recent debris decision will be, as we stated at the time, a general desertion of the ditches, dams, etc., in the mining regions. A ditch tender of the North Bloomfield Co. informs a Nevada *Transcript* reporter that "on Sunday the company ordered all the men off the line, gave instructions to have the waste-gates thrown wide open, and will this winter let their 157 miles of canals and flumes, which were constructed at a cost of \$708,841, take care of themselves. Mr. Bates says that the Milton Company (having 80 miles costing \$391,179) and the Eureka Lake Company (with 163 miles costing \$723,342) have likewise abandoned their ditch properties, and the army of white men heretofore required to keep them in repair are now without an occupation. The principal damage that will result to property will be from snow slides that may sweep some of the flumes away from their elevated perches on the precipitous mountain sides.

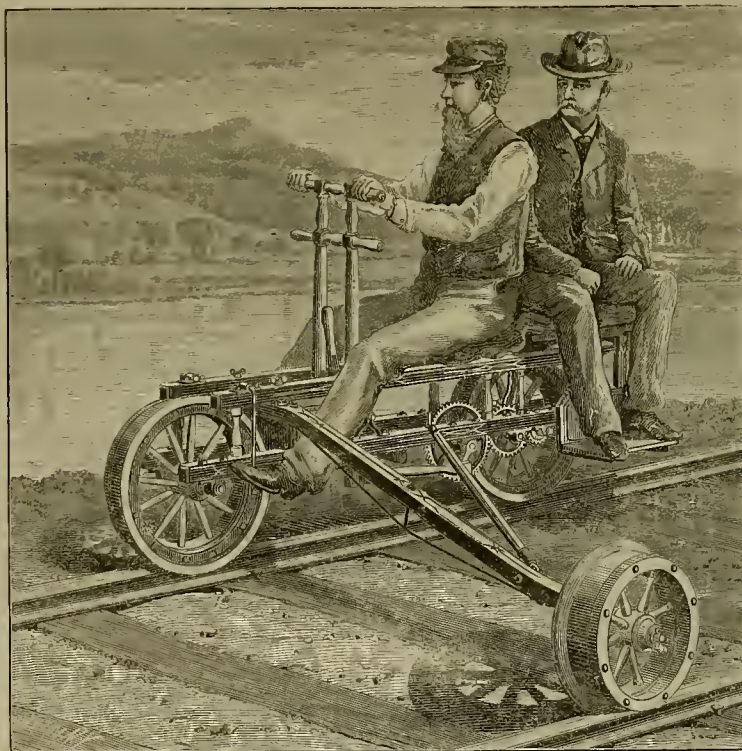
The State Mining Bureau.

This institution, though crippled from want of means, has done much during the year past towards promoting the several objects for which it was created. A large number of geological and mineralogical specimens have been collected and properly cared for, the more important having been classified, labeled, and where there were facilities to that end, placed in mounted glass cases. The additions to the museum have been numerous, the library has been somewhat enlarged, and many minerals have been examined by the State Mineralogist, and information concerning them given to parties seeking the same. An immense number of people, many of them strangers from abroad, have visited the rooms of the Bureau, evincing the deep interest taken by the public in all

A Railroad Inspection Car.

The illustration on this page shows a new form of three wheeled inspection car for railroad use. It is propelled by one person, and is so arranged that another person may be carried. The division superintendent or road-master being thus able to frequently and closely inspect the road with little trouble. In this way, by taking a section-hand to run the velocipede, he can personally visit a large portion of the section under his charge in a single day, and have needed repairs made immediately.

The car is propelled by a rowing motion, and auxiliary foot-power. The frame, wheels and arm are made of white ash, the frame being firmly held together by bolts. The arm or outrigger is stiffened by an iron brace. The tires are cast iron, the axles and crank shaft are



A NEW INSPECTION CAR FOR RAILROAD USE.

that pertains to our mining industries, mineral resources and the geology of the State. A good many young men, residing both in the city and the interior counties, have been frequenters of the Bureau of late, coming to study and familiarize themselves with the mineral specimens, with a view to searching after them in the field; what is seen and handled being so much more readily recognized and better remembered than what is merely described in books.

This institution, if sustained and properly fostered, will become not only a promoter of science, but a great educator of the rising generation.

In view of the approaching World's Fair, which it is proposed to hold in San Francisco, it becomes to Californians a matter of consequence that the life at least be kept in this institution until that event occurs, since it would be sad indeed if to the thousands who may then be expected to congregate here we had only the remains of the late deceased to be presented.

iron, and the crank and stirrups of malleable iron. The arm or outrigger is adjustable and can be removed at will. The car weighs about 140 pounds, and is made with either a 17 or 20 inch drive; geared three or four and a half times as may be deemed expedient. It is stated that there are some 4,000 of these cars in use, both in this country and in Europe. H. P. Gregory & Co., Nos. 2 and 4 California street, in this city are agents for this coast, and have put several of them in use in the State. Mr. John Vance, who is using one of them on a railroad in the lumbering region near Eureka, says it exceeds his expectation and is exceedingly useful. Several forms are made, one for a single individual; one to carry two, as we have shown in the engraving; and one intended for two men to propel and carry tools, etc. The latter is useful for the repairers of a telegraph line along a railroad, and for ample repairs on the road itself. It supplants in many instances the cumbersome hand-car ordinarily in use.

Notes Upon the Rings of Saturn.

At the last meeting of the California Academy of Sciences (January 21st) Professor Davidson reported upon some special investigations which he had been making upon the planets, and called attention particularly to the division of the outer ring of Saturn and the phases of the dusky ring.

The outer ring is not divided into two rings of equal breadth. On the preceding part of the ring the Encke division is nearer the outer circumference, but on the following part of the ring the Encke division appears farther from the outer circumference.

The preceding exhibition is the true one. In the case of the following he showed that the shadow of the elevated outer circumference of the B, or main ring, projected beyond the Cassini division, and there by decreased the visible breadth of the inner breadth of the outer or A ring. On the 17th of January the atmosphere was sufficiently steady to admit a comparison of the apparent width of the dark Cassini ring at the preceding and following parts of the ring system, and the dark ring appeared broader at the following part where the shadow would be cast.

Upon a great many nights the preceding part of the dusky ring appeared brighter than the following part. Some very few times this has appeared, but whenever the atmosphere has been fairly steady the first condition seemed to be normal. The question naturally arose whether the rotation of the ring could be discovered from watching this phenomenon; but no prolonged equable condition of the atmosphere was experienced. Again, it seemed that the direction of the unsteadiness of the atmosphere might influence the judgment. But he seems to think that a reasonable solution is found in the preceding part of the dusky ring, now receiving more light than the following part, because the surface of the planet would reflect its light more upon the preceding than upon the following, on account of the preceding side of the planet being more directly faced towards the sun.

Another item of interest with regard to the dusky ring, is its appearance when projected upon the body of the planet. It does not seem to fade away from its junction with the ring B, to its inner circumference, but the inner circumference appears more as a darker line. Of course there is the probability that there may be a dark line on the body of the planet in line with the inner circumference of the dusky ring, and thus the above appearance would not then be simply the effect of an increase of density of the inner ring nearest the planet.

These are matters for larger telescopes and he hopes they may be examined.

A curious accident occurred last week at the Sheep Ranch mine, in Calaveras county. Mr. Javaux was ascending the shaft on the tub, when a strand of the wire rope broke after the tub had made an ascension about 200 feet from the bottom. The strand of rope after it had been broken began to unwind with a lightning velocity, and went whirling down the shaft with a dangerous whirl towards the human freight on the tub. Mr. Javaux, realizing his perilous situation, jumped from the tub, and by chance caught on a slippery timber. He was obliged to stay there until assistance came down the shaft.

CORRESPONDENCE.

Tuscarora Mines.

[From our Traveling Correspondent.]

EDITORS PRESS: Tuscarora Mines, Elko County, Nevada, by many on the outside have been considered to be practically worked out and dead, with no hope of a day of resurrection for this part of Nevada. They recollect of Tuscarora's prosperous days, her massive specimens of solid silver nuggets, and her large bunches of wire silver moss, clinging to beautiful crystallized specimens that far discounted any of the finest specimens that the Comstock ever produced in her best days. The Comstock has several times been pronounced dead, and long before she had reached half her productive strength or half her present depth very prudent ones pronounced her solemn obituary, and the world was assured that the day of profitable working was past with the Comstock mines.

Tuscarora, like very smart children, they "knew was destined to an early death." The history of mines is constantly repeating itself. Whenever, for one reason or another, either parsimony, poverty, or an entire lack of mining skill, or for any purpose of stock manipulations, the development work is allowed to stop while the rich ores in sight are being extracted, we are almost sure to hear of a worked-out mine, and often a suddenly abandoned camp.

The Navajo.

Belle Isle, North Belle Isle, Independence and the P. and P. mines are all under the superintendence of Mr. W. C. Price, who entered on his arduous duties in 1882 under many discouraging features—much repairing and improving to be done about mill and mine machineries. But the more important task was the driving of prospect work in the mines to open up the ore chambers and stoppings that would produce the regular shipments of bullion as in the prosperous days of old. By sinking and crosscutting in different directions, and by very close and careful study of the formations and relations of the stratifications, the various spur dips and breaks of the leads were traced, and good bodies of rich ores rapidly brought to the surface, and still other rich bodies of stoppings opened ready for removal.

My journeyings under ground in company with the underground foreman, each with lighted candle in hand, wandering through different drifts and levels of the Navajo mine, were interesting. We saw the timbers, large and stout, that had been gradually pressed between the walls of the tunnels until the ends had shivered up for several inches, and additional posts still larger had been added, to support the pressing rock walls. It was quite interesting to know: "Here we found rich ore, and just up there were some pockets of splendid specimen ores." "Here we run this uprise to the tunnel above to improve the ventilation." You can wander around a long time in this mine, and see no pay ore—only see where it has been, and though 60 to 70 men were working there, you see scarcely any of them, for the most of the men will be working between the different levels, stopping out the ledge matter which is there retained until allowed to descend into the tunnel car through the chute door. The Navajo's principal workings are above 450 feet level. The richest ores are on the lowest levels, 450 feet from the surface.

The lowest sinking on this mine, when there last of November, was 680 feet, where they found but a small amount of water. The surface ores were chlorides, changing to sulphurets when coming in contact with the water—and even that called chloride ore carries enough of sulphurets to require furnace treatment for successful working; and this is provided for in a double Howell and White rotary—the first to oxidize the base, and the second, in which the salt is added automatically, the chloridizing of the silver is done very successfully and very cheaply.

From the Superintendent's annual report of August 1883, we learn that the 10-stamp mill ran 300½ days, milled 3,955.35 tons of Navajo ore, 282½ tons of custom ore, making an average crushing of 13½ tons of ore per diem. The average pulp assay of the ore from the Navajo mine was \$199.40 per ton, and was worked to 92-3.5 per cent of the battery assay; custom ore averaged \$332.10 per ton and was worked to 92 per cent. (This, considering the worn condition of the mill, is a very successful working). Shipped bullion on customers' account to the amount of \$64,863.42; on Navajo's account, from Navajo ore, \$730,379.38; from custom ore, \$2,206.58; making a total production in bullion of \$818,898.75, (assay value), from the 21st of July, 1882, to 7th June, 1883.

During the year the main operations of the mines under the charge of Mr. Price have been developments for the future—sinking the main shaft 350 feet through very hard rock, and running various drifts for the development of new stoppings; improving the facilities for power drilling, and for the pumping of the increased waters from the lower levels. To give even a small epitome of the underground works and various plans for success in the most economical and thorough manner would make this too long a communication.

Last summer these dilapidated 10 stamps were sending out from Tuscarora an average of

over \$73,000 per month, and disbursed to stockholders dividends of \$200,000—for this is a dividend, not assessment-paying property.

Mr. Price is highly spoken of by the best business men of the community, who give him much credit as an energetic, skillful, economical and successful Superintendent. No where about the premises did I see any except what appeared to be good, sober, reliable men, and remarkably free from improper language.

The Belle Isle and the North Belle Isle are working through same shaft, with good hoisting works—working about 35 men. The independent also with good works employ about 20 men. These several four companies are San Francisco incorporations, and all under the charge of Mr. Price.

The Grand Prize

And Argenta mines, lying on the opposite side of the town from the Navajo, each hoist through same shaft. The principal owner of these very valuable mines is Mr. (F. W. Grayson, of San Francisco. The ledge is, at the surface, from 4 to 15 feet thick, chloride ore, but at the depth of 180 feet they encounter some water and the ore changes more to sulphurets, and requires roasting to work successfully. Their 20-stamp mill is so situated as to run the car from the shaft direct to the mill, where it is crushed dry and then passed through the Howell-White rotary furnace and then through the usual pan processes.

The mill was started up when I was there, and has since been making some large shipments of bullion, as I have noticed in the *Tuscarora Times Review*, a live sheet of a very neat little mining city of about 1,000 people. Not having the bullion figures at hand I will omit them for the present. They are too large to guess at. The hullion bar, say of \$1,800 value, will have \$80 to \$90 of that value gold. This company met with a very serious loss on the 29th of June last, by the burning of their large hoisting works, which have been but partially replaced. They are able to work only 400 feet levels, instead of going down to their 800 feet level, where they were sinking before the fire. When there they were working 55 men, but expected soon to add 20 to 30 more men. This property has produced many very fine specimens of nugget and wire silver that here and there seem to be injected in the quartz crystal cavities. This property has already made a grand record, and holds in reserve the grander prizes yet to be developed and shipped in bullion. The fuel is being cut off for a few miles distant, but can be obtained yet for a few years before they will be dependent on the railroad for coal which is now being used some little.

There are several other mines in and about Tuscarora partially opened, and that inspire their owners with visions of the bars and bricks, and also with a hope of soon being able to visit friends, and make a home under more sunny skies than they can now realize in their tunnel labors.

The Town of Tuscarora

Was to me a great disappointment. In every respect it was far ahead of all my expectations. It has a pleasant, sunny location on the warm south and easterly slope, looking off on an extensive valley with gentle hills off beyond. The elevation of the town insures about the true thermal—being between the severe frosts of the valley in front and the snowy heights of the mountains in the rear.

The families seemed to be of good social standing and intelligent grade, believing in good schools, and were maintaining an able minister, a large singing school and Sunday School; hotels, restaurants and lodging houses seemed to be made very pleasant for the visitor. They have "the will and way" of treating visitors so that they would like to stay longer. A trip on Mr. Cluggage's stage from Elko—a distance of fifty miles—is over rolling hills and pleasant valleys, giving a good appetite at the half-way house (Wieland's) for a dinner that is noted for the universal praise it receives, and the severe criticism it causes to be heaped on all Chinese efforts as compared with the truly orthodox American woman's family dinner.

Mart Smith, stage agent and express man at Tuscarora, sees well to the comfort of all who are to be seated, and starts them out on time, each feeling that he is having the first choice of seats. A well armed escort is sent along with the hullion shipments.

If Tuscarora could only have the benefits of a near coal mine she would soon develop a very wealthy mining camp. She now has a small foundry and machine shop by Mr. James Dove, serving a great convenience for machinery repairs. There are several large full assortment stores for all the necessities of the town and surrounding country ranches. Game, too, is very abundant; venison plenty.

The great need is for men of capital to employ some of that capital to develop the mines that are owned by poor men, who have not the means to place machinery and do the opening labor. Merchants who must here carry large stocks and advance large amount of freight money to land goods here, cannot advance money to open mines, nor can they sell goods on long credits to the men who wish to open mines, even though they may have the greatest assurance of the merits of the claims.

Elko, the county seat, is thriving as a railroad town and shipping center to various mining camps. Has two newspapers, a daily and a weekly, besides, the daily issues a weekly. The county has able and reliable business men in the various county offices, and is moving on steadily in mining, agricultural and stock develop-

ments, having a bright future before her. Elko has the initiatory startings for a State Mining School now open and a class going on in a course of practical assaying.

The State University has also made its starting here with quite a creditable academic class (both sexes), under the charge of Prof. Farrington, a teacher of considerable successful experience on the Pacific Coast.

The agricultural resources of Elko county are by the cattle men greatly underrated, some say, "and that, too, for a purpose." They prefer plenty of room and free roaming for their herds.

I found Superintendent Charles Crandall, of Elko Consolidated Hoisting Works, Tuscarora, quite busy pushing on the development work very quietly. Had reached depth of 200 feet in the working shaft and made connection with north shaft, 165 feet distant; was expecting to crosscut and expose more mineral; was working only a small force, four men on each shift, but probably by the opening of spring he will be able to make agreeable reports to the San Francisco and New York stockholders, and annoy the stage company with ponderous foot-mashing bricks as ballast. Had I not visited Tuscarora after a small snow storm, I might have done her better justice by visiting some of her mines outside the city limits.

B. W. CROWELL.

A Short History of a Gigantic Quartz Claim.

[Written for the Press.]

Near the town of Washington, Nevada Co., on what is known as Phelps' Hill (a horseshoe shaped mountain), is located one of the most gigantic quartz ledges ever discovered on this coast. The ledge proper is from 40 to 60 feet between walls, but upon first approaching the claim it has more the appearance of an immense quarry of quartz; for the reason that immense boulders have fallen from the croppings, which tower above the ground in some places from 100 to 150 feet. This claim was originally located by Captain Miller, in 1874, who first named it the "Bessie Miller," but afterward changed it to the "Giant," which it bears at the present time. It has been developed by running three tunnels, lower, upper and middle.

The first tunnel started to tap ledge was the lower, and of such dimensions as to enable the ore cars to be drawn by mules. The estimated distance to tap the ledge is from 900 to 1,000 feet, giving about the same number of feet of backs, or ledge overhead.

After driving about 100 feet, Captain Miller, in estimating the expense of running so large a tunnel the great distance necessary to tap the ledge, found it would be so great that he feared he could not raise the required capital; he, therefore, decided to discontinue it for the time being, and start one of the usual dimensions further up the side of the mountain.

Soon after, he began what is known as the Upper Tunnel, estimated to tap the ledge at 200 feet, giving about 75 feet of backs. He had driven about 120 feet, when, in June, 1879, he entered into partnership with a San Francisco capitalist, who agreed to develop the property to the extent of \$20,000, for one-half interest. Before closing the agreement, this capitalist had the rock mill-tested, in order to satisfy himself as to its value. Three tons were broken from the boulders which had fallen from the croppings, and milled in Nevada City, yielding \$18, or \$6 per ton. At the same time a government survey was made by Deputy Surveyor Samuel Bethel for United States patent.

Immediately after entering into partnership the middle tunnel was resolved upon. This tunnel is estimated to tap the ledge at 400 or 500 feet, giving about 400 feet of backs. Their intention in driving this tunnel was to tap the ledge at a greater distance from the surface, and connect the two tunnels (upper and middle) by an air shaft.

In July, 1879, only a month after the partnership was formed, Capt. Miller suddenly died. Shortly after his death this capitalist put a force to work under a superintendent to continue the middle tunnel, and as he progressed he became very enthusiastic over the prospects. Thinking he might secure the whole property to himself, he entered suit against Mrs. Miller (the widow of Capt. Miller), which resulted in his defeat, the entire property being returned to Mrs. Miller. From this time but little was done to the property until secured by the present owners in November, 1882.

The present owners propose to continue the middle tunnel, cross-cut and thoroughly prospect the ledge. Up to the present time about 175 feet have been driven and the prospects are very encouraging. Several stringers have been cut, one three feet wide, from which specimens were taken showing gold.

Favorable indications of the existence of a valuable ledge in this location are evident from the fact that in the bed of Washington Creek, directly at the base of the mountain in which is the Giant ledge, placer mining has been profitably carried on for over twenty years. It stands to reason that the gold must originate from the Giant ledge, for right here, where the croppings of the Giant ledge have fallen into Washington Creek, is the only place along the entire bed of the creek where gold is found.

Many fine quartz specimens showing gold have also been found in these placer diggings.

A water ditch is connected with the property. It takes its water from Washington Creek, about two miles above the mine, and runs directly under the middle tunnel; it will give a fall of 300 feet, almost perpendicular, at the mill site, which is near the lower tunnel, in the bed of Washington creek.

The famous Sierra Buttes mine, bought by an English syndicate in 1869, is situated only eighteen miles north of the Giant, on the side of the mountain. It compares almost exactly in respect to convenience of working the ledge, mill-site and grade of rock. A full description of the Sierra Buttes is contained in the MINING AND SCIENTIFIC PRESS of April 14, 1883.

With the prospects now apparent, the owners have great faith in the future of the Giant mine, and with careful management it bids fair to equal any mine in the county in size and wealth.

The Earth—Geological History.

[Written for the Press.]

Are we on the eve of a new era in the world's history, a new epoch, a catyielism of events, a wreck of matter and a crush of worlds? The year 1883 has been a year of disaster, and life with misfortune to the human race. Atmospheric, aqueous and igneous agencies have been unusually active. Their effects have been seen and felt in every quarter of the globe.

On the American continent cyclones, tornadoes and floods have occurred with their attendant results of loss of life and destruction of property, and attended by extraordinary electrical phenomena. Epidemics (the yellow fever) have raged with extraordinary virulence, both in Europe and Asia. In fact, from the whole civilized world we have detailed accounts of great losses by earthquake and volcanic action. Large areas with their inhabitants have been submerged, with corresponding elevation of "terra incognita." The "fell destroyer" has had a holocaust of victims, and the end not yet. Within the memory of man and his written history we have no parallel. Historical geology and traditional lore alone obscurely teach us of similar disturbances, prior to the advent of man. The great book of nature, when intelligently read by the scientist, unerringly points out the changes that have occurred since the formation of the earth we inhabit. This language, though dead, is easily read and interpreted by nature's student, the geologist. Much time and talent have been devoted to this subject. Quoting from a distinguished geological work which treats on "Historical Geology," the author states that the earth's history is divided into eras, ages, periods and epochs, which have been recorded by nature in separate rock systems, series, formations and strata. From indisputable evidence it is proved that there have been times of rapid revolutionary change, with periods of comparative quiet during which forces of change are gathering strength, followed by periods of rapid change during which accumulated forces produce conspicuous effects. The earliest era is the archæan, which is followed by four others, the latest being the psychozoic, in which we find the first authenticated evidence of pre-meval man and his implements of art.

Prior to this time animal life abounded in mammoth proportions in the cenozoic era, in which we find the tertiary and quaternary systems. The psychozoic era—an era of mind—is recorded in the recent system. The cenozoic was the culmination of the mammalian age. The most formidable in size was the mastodon, the mammoth and the megatherium—species long since extinct. Each era had its distinct classes of fauna, which on reaching the turning point of their existence, like the individual, gradually degenerated, or were violently and suddenly exterminated by a law of nature, that not only governs the universe with its immensity of systems and worlds, but their inhabitants as well—constant change, progression and retrogression.

N.MAN.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANES, State Mineralogist.]

[CATALOGUE.]

- 5125. Silver Ore—El Capitan, Pinal Summit, sixty miles east of Florence, Pinal county, Arizona. J. G. Manning.
- 5126. Silver Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; 400 foot level. Thomas Ewing.
- 5127. Silver Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; second winze, 200 foot level. (See No. 5128.) Thomas Ewing.
- 5128. Silver Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; third winze north, 200 foot level. Thomas Ewing.
- 5129. Silver Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; 400 foot level. Thomas Ewing.
- 5130. Silver Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; seventh winze, 400 foot level. Thomas Ewing.
- 5131. Silver Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; 400 foot level north. Thomas Ewing.
- 5132. Silver Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; 450 foot level. Thomas Ewing.
- 5133. Silver Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; fourth winze, 300 foot level. Thomas Ewing.
- 5134. Silver Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; fourth winze, 400 foot level. Thomas Ewing.
- 5135. Silver Ore, fine Chloride Ore—Bonanza King mine, Providence Mountains, San Bernardino county, Cal.; 400 foot level. Thomas Ewing.

MECHANICAL PROGRESS.

The Limitations of Machinery.

Not very long ago watchmaking was one of our most prominent industries—prominent not because the capital invested or number of persons employed in it was remarkably large as compared with many other industries, but from the fact that it seemed to offer a most striking illustration of the triumph of American ingenuity over all obstacles, natural and artificial.

Until we began to make watches the trade had been almost monopolized by Switzerland and England. The Swiss had attained a special celebrity for their skill in the art, and some English makers produced work equally good, but the Swiss watches, besides being well made, were very cheap, and consequently there were but few parts of the world in which they were not known and esteemed.

But the application of machinery and the factory system to watch manufacturing in this country caused a sudden change in the situation. The frugal habits of the Swiss workman, his simple diet of black bread and wine, his patient industry, even the rare technical skill which had been handed down from father to son through generations of watchmakers, were not sufficient to offset the ingenious machinery of the American factory—those marvelous machines, so wonderful in their accuracy and rapidity, never tiring, never making mistakes, needing not even the poor fare of black bread and wine, but content with the still cheaper diet of steam. It seems as if Switzerland's famous industry had seen its best days, and American time-pieces were to supersede all others.

It is a pity that a picture so pleasing to our national pride has not yet, and perhaps never will be realized. The American Consul at Geneva has recently made a report to our government on this matter of watchmaking, and from his paper it appears that in this industry Switzerland has now regained all the ground which had been wrested from her by our own manufacturers.

At a test of English, Swiss and American watches made recently at Geneva, under circumstances that forbid any idea of fraud or error, it was found that the Swiss watches were superior to all others, and the English came next in point of merit. But the Swiss watches were the cheapest as well as the best.

The explanation of this is very simple. The Swiss have taken our machinery and supplemented it by a manual skill and system of technical training which we do not yet possess.

The lesson of this is that mere machinery will not do everything. Skilled workmen must accompany good machines in every country which desires to excel in the industrial arts. It is worth while to emphasize these points, because many people, and among them quite a number of manufacturers, entertain the idea that American machinery is sufficient within itself to give us the advantage over all other nations. It is these persons who, believing that machines are all that is necessary, and that any cheap laborer will do to attend them, scoff at plans for the technical education of mechanics, improved systems of apprenticeship, and other reforms advocated by more intelligent and public spirited men.

Yet, as we see in this illustration from the history of watchmaking, we cannot hope to monopolize our machinery, and it is therefore of the highest importance for us to produce by means of a judicious system of apprenticeship and technical training a body of workmen as well versed in the fundamental principles of mechanics, as quick of eye and deft with hand as the men the technical schools of Europe are now turning out to compete with us.—*The Blacksmith and Wheelwright.*

Light Iron Castings.

Many years ago articles of cast iron of a light, fragile and ornamental character known as "Berlin (German) jewelry," were quite fashionable. It seemed, then, almost impossible that these should be simply castings of iron, and it is within a comparatively recent period that the possibility has been proved by the production of similar articles in this country. When of an ornamental design, as the shoe buckles, belt buckles, shawl clasps and hair pins, iron frequently has the market name of steel, and such "steel" ornaments are very common and in general use. But they are made of iron cast in sand moulds exactly as massive lathe beds, planer beds, and anvils for drop hammers, weighing several tons each, are cast.

The brilliant polish on the ornamental articles is produced by means of emery wheels, rag, rotten stone wheels and rouge wheels, prefaced by the action of the tumbling barrel.

Of course, only the easiest flowing iron is fit for such fine work. This is charcoal produced iron, that from the Salisbury mines in western Connecticut being admirably adapted to these purposes. There is an establishment in Connecticut that melts, for the purposes of minute castings, about ten tons of soft charcoal iron a day, casting scissars and shear blanks, clock bells, clock keys, drawer keys, door keys, piano tuning keys, rings, barress buckles, ornamental buckles, horsemen's spurs, and a hundred other

articles, not one of which will weigh twelve ounces, and many of which weigh less than an ounce. Some of these articles require in their finished state more than one hundred to the pound in weight. So minute are these castings, mainly moulded from plate patterns, that the used sand of the moulds must be sifted to discover all the results of the day's casting.—*Scientific American.*

A Process for Softening Iron Castings

A revolution in the manufactured iron trade is announced from Melbourne, where two local iron founders, Messrs. Jenkins and Law, are reported to have discovered a new process in their trade. It appears that an accidental discovery was the commencement of the invention; a fragment of cast iron having been dropped while hot into a water channel, and afterward broken, when it was observed to be soft and tenacious, instead of hard and brittle, as might have been expected. This phenomenon led to inquiry and experiments, with a view to ascertain the reason for the change. It was supposed that the temperature of the metal and the composition of the water were the principal circumstances which combined to produce the transformation; and, after numerous trials, the right temperature to which the iron should be brought before immersion was discovered, and also what foreign elements were required in the water. The metal is merely dipped in the bath, not steeped, the required change being physical, not chemical; and the ingredients of the liquid are common and cheap. As patented, the process is briefly as follows: The castings are run in a chill, or iron mold, allowed to cool, reheated in a furnace to a particular temperature, and then plunged into the bath. Thus treated, the iron develops a close, tough, and comparatively soft grain, so much like that of average steel that, according to the *Melbourne Argus*, experienced founders in the colony had great difficulty in believing the metal to be cast iron at all. By this process it is claimed that the adamant hardness of chilled castings is removed, and further positive advantages are conferred. This is saved by the great extension of chill castings for purposes to which their hardness formerly rendered them inapplicable. It is contended that the metal is also made much stronger; a bar that would break with a load of 1,200 pounds under the old system being capable, if made in the new way, of withstanding a strain of 1,900 pounds. Lastly, the soft, tough grain produced by the new process increases the facility of working the metal, with a corresponding diminution in the wear and tear of tools, and a finer appearance in the finished article.

EFFECT OF FURNACE GASES ON IRON.—There are exhibited in a museum in Darmstadt, Germany, some samples of round bar iron which have suffered a very peculiar change. These bars of iron were formerly placed within a large chimney at the Frankfurt gas works to serve as footholds as it became necessary to ascend the chimney. For several years they were exposed to the various gases at a high temperature, and probably there was among them plenty of carbonic oxide. At last the chimney began to bend and twist, rendering an investigation necessary, when it was found to be due to the increase in size of these bars.

They consisted originally of bars 2.3 centimeters (about 1 inch) in diameter, but have grown to be 3.3 or 3.5 centimeters (1 1/8 inch) in diameter. One was examined and found to have within a core 2.1 centimeters thick, surrounded by this external envelope that had been changed and enlarged. The *Gewerbeblatt* for the Grand Duchy of Hesse, from which we gain this information, does not venture any theory as to the probable changes or their causes.

THE SPRING CAR MOTOR.—The United States Spring Car Motor Co., of Philadelphia, recently exhibited its spring motor. It is stated that much interest was taken in the project, and that the company intends to go forward and prepare its motor for use in street cars and factories. The process involves the use of heat chemically pure and of great intensity. It is reached by mixing gas with air at the point of ignition, projecting the flame thus produced against the steel with great force. The steel thus rapidly heated to any desired extent, passes through the cams of the coiling machine and receives its coils. As it leaves the coiling roll, and within six inches of the last jet of heat, it is struck on each side by a blast of cold air with such force as to chill it, thus giving it the proper temper. A spray of water follows to remove the latent heat. A similar company is said to have been formed in New York.

COKE FOR FOUNDRY PURPOSES.—Coke is being successfully introduced for foundry purposes in New England and elsewhere, in preference to anthracite. The advantages claimed for coke over anthracite are: First, a duty 30 per cent higher than anthracite. Second, a rate of smelting from 30 to 50 per cent higher than that of anthracite. Third, a less powerful blast is needed. Fourth, the castings are softer.

A new glass recently invented in Vienna contains neither flint, potash, soda, lime nor borax.

SCIENTIFIC PROGRESS.

San Diego Natural History Society.

Probably there is no place, outside of the immediate vicinity of this city, where original research in science and particularly in natural history—is so diligently and effectively carried on as it is in San Diego. They have a fully organized and active society of natural history in that place, whose constant and efficient labors, though quietly and most unostentatiously conducted, are constantly adding to the world's store of knowledge. They hold regular meetings, the proceedings of which frequently find their way into print. The following officers were recently elected for the current year: President, Dr. G. W. Barnes; Vice-President, Joseph Winchester; Recording Secretary, E. W. Hendrick; Corresponding Secretary, Rosa Smith; Treasurer, C. J. Fox; Librarian, Mrs. Z. R. Cronyn; Curator, Dr. D. Cave; Directors—D. Cleveland, G. W. Barnes, C. J. Fox, E. W. Morse, J. G. Capron.

Several interesting papers were read at this meeting, among which was one by C. C. Parry, a historical notice of the *Pinus Torreyana*. It appears that this tree is confined to an exceedingly limited locality. As far as known it is found only on a small extent of coast line—not more than four miles in length, and extending only one mile inland. The locality lies between San Dieguito and a point about one mile south of Soledad, in San Diego county. Some interesting historical facts were given in relation to the tree, by Mr. Parry, who was the first to announce it as a new species.

The bulk of the tree-growth is mainly confined to a series of high broken cliffs and deeply indented ravines on the bold headlands overlooking the sea south of Soledad valley and within the corporate limits of the town of San Diego. Here, within a radius of not more than half a mile, this singular species may be seen to the best advantage clinging to the face of crumbling yellowish sandstone, or shooting up in more graceful forms its scant foliage in the shelter of the deep ravines, bathed with frequent sea-fog. One of the finest specimens seen reaches a height of nearly fifty feet, and shows a trunk eighteen inches in diameter at base.

Many collectors have visited this locality, and have taken away thousands of this well-marked new species to the remotest parts of the earth. The chair was instructed to appoint a committee of three to report and act upon such measures as may be deemed best for the preservation of the remnant of the *Pinus Torreyana* at Soledad.

Another paper was read by C. R. Orcutt, in relation to the recent additions to the flora and fauna of our State. The writer stated that since the last annual meeting over a dozen discoveries have been made in species of plants indigenous to this section, while many more have been discovered unknown hitherto in California.

The Corresponding Secretary, Rosa Smith, read some very interesting notes upon spiders. Particular mention was made of the *Epeira atrata*, in which she quoted from Dr. McCook as follows: At Aptos, near Santa Cruz, I secured an *Epeira* and cocoon of eggs and young spiders, which have revealed some curious facts in regard to insect parasites. Of these Dr. McCook writes: "One interesting thing about the *Epeira* cocoon is that it is strangely infested by parasitic and other enemies, no less than four. There were first a number of small reddish ants alive, probably a species of *Solenopsis*, which no doubt were feeding upon the eggs and debris; second, several larvae of *Dermestidae*, probably *Attagenus peltio*. These were creeping into the silky interior at will, though some of them were ensconced within the empty cells of some ichneumon. Next I found alive a very small ichneumon fly. I have never yet seen quite such a 'happy family' within the bounds of a spider's egg nest. The spiderlings seemed to be contented, and indifferent to the presence of these intruders."

The "Fourth State of Matter."

Mr. W. Crookes gave a lecture recently before the Western Microscopical Club, on "Recent Discoveries in High Vacua." He illustrated his theme with a series of brilliant and interesting experiments. The effects were produced by a large electric coil having 60 miles of secondary wire, and worked by two cells of a storage battery. The coil, when attached to its full complement of 30 cells, would give a spark in air of 24 inches. "High vacua" were defined as those ranging from above the one-thousandth to the one-hundredth-millionth of an atmosphere. Air and all gases are conceived to consist of myriads of excessively minute molecules, which, in the ordinary state, vibrate with enormous velocity; but, being crowded together in that condition, their extent of vibration is impeded by each other, and is, in fact, limited to a path of only one-tenth-thousandth mm. When, as in a partial vacuum, there are fewer of these molecules, they have more room in which to vibrate, and hence their "mean length of path" is increased.

Under the influence of electricity these molecules are driven in straight lines from the negative pole. In a comparatively low vacuum, on the passage of an electric current, the residual

air assumes a stratified condition, showing alternate light and dark bands. The width of the dark bands marks the length of the excursions of the molecules. Further exhaustion increases the width of these bands, so that in a vacuum of one-millionth of an atmosphere the free path of the molecules was seen to extend to about four inches. By means of an exhausted V-shaped tube it was shown that these molecules are driven from the negative pole in straight lines, and hence cannot turn a corner. First one limb of the V, then the other, was connected with the negative pole of the coil, with the result that each in turn was in darkness. In another vacuum tube, a concave negative pole was fixed, the molecules were driven normally from this concave surface, and, meeting the cylindrical surface of the glass enclosure, were thrown into beautiful caustic curves.

That these molecules, under the influence of electricity, possessed mechanical force, was shown by causing them to impinge on the vanes of a radiometer, when a rapid rotation took place. On reversing the current, the direction of rotation was also reversed. That this was not due merely to the passage of an electric current was shown by a vacuum tube containing a small horizontal "water wheel." Its upper and lower floats being struck equally by the radiant matter, no motion took place, but on diverting the flow of radiant molecules by means of the external application of a magnet, the molecules were caused to strike the upper floats only, when revolution took place. By reversing the magnet, the path of the molecules was diverted so as to strike the lower floats, and thus to reverse the rotation. Radiant molecules are not attracted by one pole of a magnet and repelled by the other, but tend to rotate round the north pole in one direction and round the south pole in the opposite direction. Hence, with a horseshoe magnet, they are deflected in a line at right angles to the line that joins the two poles. The mechanical effect of the impact of these radiant molecules was further shown by converging them by means of a concave negative pole to a focus in which was a small bundle of platinum wires. These wires were rapidly raised to a white heat by the vigorous though inaudible bombardment. Further, the impact of radiant molecules on certain bodies produces phosphorescent light; thus they give to potash-glass a green, and to lead-glass a blue tinge. If in an exhausted tube an obstacle, such as a piece of mica in the shape of a cross, be set up, a dark shadow of it is thrown on the positive end of the tube, the part surrounding the shadow being rendered phosphorescent by the impact of the molecules. On suddenly removing the obstacle, the part that was in shadow glows brighter than in surrounding luminous space. This effect is due to the molecules acting suddenly on a new, and as it were, untired surface.

DYING CUT FLOWERS.—It has for a long time been known that the color of growing flowers can be altered by simply mixing a little dyestuff with the mold in the flower-pot. No one, however, has hitherto thought of changing the colors of flowers when cut. We have in London many artists whose business it is to give to birds finer feathers than nature has allowed them, and we have now a counterpart in flowers. Mr. Nesbit, a distinguished botanist, has found that by simply soaking the stems of cut flowers in a weak dye solution, their color can be altered at will, without the perfume or freshness being destroyed. Most beautiful effects are produced by prepared lakes. Singular to say, flowers refuse to absorb certain colors, while they dispose of others in different manners. If placed in a mixed solution they make a complete analysis, and some lilies which had been treated with purple showed distinct red and blue veins, the colors having been divided in the process of absorption. [London Paper.]

AN INTERESTING EXPERIMENT.—During a recent lecture in the Philadelphia Academy of Pharmacy, glass jars were passed around containing samples of cultivated disease germs. Potatoes cut in halves had been lightly smeared with a coating of substances containing germs. The bacteria were nourished on the moist surface of the potato, and presented very interesting appearances. Different results were obtained from different bacteria. Some of the half potatoes were covered with an ordinary deposit of mold. On others the disease germs had developed into thin, peculiarly shaped patches of fungus growth of bright blue, red, yellow and greenish colors. Others had grown into an intricate and extensive network of fuzzy filers, the growth on the surfaces of two or three potatoes reaching over and covering a space having a diameter of eight or nine inches.

BACTERIA IN MOUNTAIN AIR.—Two scientific investigators, one Swiss and the other French, have been analyzing the Alpine air. They ascertained that entirely pure air is not found until an altitude is reached of from 6,000 to 13,000 feet above the level of the sea. The atmosphere around the lakes below that level, however pure and beautiful apparently, was found to contain bacteria. Nevertheless it was pure enough by comparison with that of the French capital, where the bacteria contained in a square foot of air are 7,000 times more numerous than those in the same quantity of air in one of the Swiss valleys.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MELIO CLAIM.—Amador Ledger, Jan. 16: We were shown last Monday a specimen of decomposed quartz taken from the quartz claim owned by the Mello Bros., and situated near Big Bar Bridge. The sample was speckled with fine gold, and would evidently assay far up into the hundreds. We are informed that the ore-body is from 7 to 8 ft wide, and if it carries gold throughout in the same ratio as the specimen shown us, the boys have struck a bonanza.

MISCELLANEOUS.—The rock of the South Spring Hill, now being crushed at the Talisman Mill, is panning out handsomely, so we are reliably informed.

Last Friday ten sacks of heavy metal, carrying a heavy percentage of gold, was taken out of the Julian mine at Middle Bar. The ore-streak holds its own.

Butte.

GOLD DUST.—Butte Record, Jan. 19: A big boodle of Butte creek gold dust was yesterday deposited in the Butte County Bank. The "perpetual injunction" does not interfere with the pick and shovel miners up in that region—they toil year in and year out, sometimes making a respectable strike, but nothing like a bonanza. The toilers are satisfied with their labor if enough nuggets can be collected to furnish the actual necessities of life. In some of the camps in this county are still to be seen old-timers who are yet working in the vain hope of striking it rich. They are still the rough, kind-hearted, red-shirted fellows they were in the days of old.

Calaveras.

LAND SLIDE.—Calaveras Chronicle Jan. 19: There was a large landslide in the Bonanza hydraulic claim on Tunnel Ridge, owned by Moser & Co., Saturday last. Nearly an acre of ground came down into the claim, covering up the "Giant nozzle" and all the tools in the mine to the depth of twenty feet. The "slide" also carried away nearly 200 feet of the ditch owned by the Mokelumne Water Company, and through which water is run to supply the Mammoth hydraulic and other claims further down the ridge. A large force of hands were immediately set at work constructing a new ditch.

PROSPECTING.—Prospecting is being vigorously prosecuted on the leads recently located on this side of the Mokelumne river at Middle Bar, and owned by Sales, Reed & Co. Sinking on the ledge is now being done and the developments thus far made are of an extremely encouraging nature.

NUGGET.—Mr. T. S. Loutit, the Lafayette Street Vulcan, found a \$90 nugget one day last week. It is a common occurrence in this place, after a heavy rain storm, for people to pick up in the streets chispas varying all the way from a \$1 to an ounce in weight.

El Dorado.

LAMPHER.—Mountain Democrat: The incline at the Lampher mine has reached a depth of 245 ft. Drifts are being sunk north and south from the bottom. In the north drift, which is in upwards of 40 ft, the vein is very wide, ranging from three to four ft. In the south drift the vein is about fifteen inches in width, but is widening as progress is made. The ore is very rich. The mill is running steadily, with good results.

Fresno.

GOOD YIELD.—Expositor, Jan. 16: Thos. Hildreth yesterday brought to town about ten pounds of gold amalgam which was taken from ten tons of ore from his mine worked by process. The ore was from the sloping of the 10-foot level. The yield was at the rate of over \$200 per ton. He also showed us a vial containing about an ounce of fine gold which was washed from a single pan of decomposed ore. The ledge is only about fourteen inches in width, but it is very rich, and seems to be getting better as they sink on it. The gold is heavily alloyed with silver, and therefore does not average more than \$12 per ounce in value. This is a characteristic of all the quartz mines of this county, and it seems to be the impression of many miners that after a certain depth is reached silver will be the predominating metal.

Inyo.

WILD ROCK.—Inyo Independent, Jan. 16: This old district is situated in the Telescope range, across Panamint valley from Lookout. The Virginia mine, owned and being developed by Paul Pfeiffer, is showing up splendidly in chloride ore assaying from 150 to 450 ounces per ton in silver.

SWANSEA.—The new Swansea furnace is in full blast, the bullion output being all that could be desired.

THE MONTEZUMA.—Supt. W. P. Miller, of the Montezuma mine and furnace, (the Owens River Mining and Smelting Co.) is now at Elina. Their own mine has on its dumps about 4,000 tons of ore, while shipments of all kinds of ore are being steadily received from all along the line of the road.

THE RED MINE.—It is stated that the owners of the Mineral Hill mines, situated at the head of Black Canon, in the Inyos, are getting out ore to ship for reduction.

BULLION SHIPMENTS.—Supt. M. R. Williams, of the Argus Range M. & M. Co.'s mines and mill at Reilly, was in town to day. He reports having got the mill in good working order, and that everything about the plant is in a most satisfactory condition. He has lately made three shipments of silver bullion—668 fine—aggregating \$70,500. The property is becoming a steady and reliable producer of bullion.

Mariposa.

O'GORMAN.—Gazette, Jan. 17: The new ten stamp, steam quartz mill of the O'Gorman Brothers, on Saxton's creek, started up last Wednesday. The new "plant" has attracted considerable attention from the community, all hopeful, as well as its enterprising owners, that it will be a success. There is already upon the dump about 100 tons of ore which shows free gold sufficient to give assurance that the rock is, by proper amalgamation, going to pay well, at least \$20, and probably \$30 a ton. Quite a number of men are already employed and assigned to

duty. Among them we learn that Joseph H. Green is to have charge of the amalgamators. Mr. Green is just the man for that position, having had a large experience as a mill man and amalgamator, and for industry and integrity he has the confidence of all who know him. The other employees in and about the mine and mill are Joseph R. Green who is to perform the duties of engineer and fireman, on opposite shifts with Wm. O'Gorman. Jos. Milburn is teamster and contractor for hauling the rock to the mill, a distance of three-fourths of a mile. Wm. Richards, John and James O'Gorman, with George Stewart at the windlass, constitute the mining force. The rock is at present taken from a drift about 35 ft below the mouth of the shaft. With large quantities of ore in sight, easily mined, the vein being large, and easily crushed, it looks as though a prosperous and permanent mining enterprise is an established fact.

Mono.

IMPROVED PROSPECTS.—Bodie Free Press, Jan. 16: The last few weeks have materially improved the prospects of Bodie district—in fact, at no time for over a year have they looked as well as now. The rise in Bodie stock is not caused by manipulation, but is the result of substantial merit in the mine. The Standard now comes to the front with a very important strike on the 700 level, where up to the present time there has never been anything of value. An east cross-cut has intersected the ledge at a point north of the shaft, and the vein is found eight ft wide, of good milling ore. No ore has ever been extracted between the 500 and 700 levels, so that there is now ascertained to be 200 ft of backs in this ground. It is unnecessary to point out the fact that this is a most important development, the value of which it is difficult to estimate.

Additional to the strikes in the Bodie and Standard, which are the most valuable that have been made in the district for over three years, the Syndicate is now milling better ore than ever before, and last month made larger bullion shipments than during any previous month in its history. They have also a large supply of this ore developed. The Bodie Tunnel Co. will have their mill running before the week is out, and they also have plenty of good ore in sight.

The bullion shipments during 1883 have amounted to over \$1,500,000. In 1884 we predict they will be nearly if not fully doubled—a prediction based upon the present appearance of things and facts within our knowledge. With the beginning of this year, Bodie entered upon a new and better era in its history.

Nevada.

GOOD.—Nevada Herald, Jan. 17: Rock which yielded \$75 per ton, exclusive of sulphurets, was taken from the Magenta mine, near Grass Valley, recently, by tributaries. More of the same kind of quartz is in sight.

RICH STRIKE AT THE FRANKLIN.—A remarkably rich strike was made last Monday morning by Hussey & Hussey in their mine (the Franklin) in the Willow valley portion of this township. The ledge which has averaged about three ft in thickness and been of high grade from the surface to the present depth (160 ft) where it measures about 17 inches, is now showing richer than ever. From three tons taken out since the first of the week in sinking the incline, were selected three candle-boxes of specimens that will apparently pay at the rate of not less than \$5,000 a ton. One old quartz miner stands ready to bet a nice little sum that they are worth even more than at that rate. More of the ledge is now being stripped for extraction and the richness shows no signs of abating on either side or at the bottom of the incline. Another level is to be opened at a depth of about 250 ft. The drift at the first level has been driven fully 100 ft along the ledge and the end of the pay chute at that point has not been found in either direction. The indications are now that the Franklin will prove to be one of the best quartz mines in the district. A few more weeks' prospecting will demonstrate its true value.

PITTSBURG MINE.—Grass Valley Union, Jan. 17: The completion of the drain tunnel to the Pittsburg mine will be the means of starting up the machinery of this favorite mine within a short time. This tunnel, which is 800 ft long, and has required two and a half years to drive it through hard ground, taps the mine at the bottom of the 200 level, from which depth to the surface nearly all the water comes. Below the 200 level the mine does not make much water, as in sinking for the 800 level several years ago the water was found so light that it was not necessary to use a workings, boxes will be put in through the full pump. Now that the tunnel has reached the old workings, boxes will be put in through the full length of the 200 level to catch the drainage above, which will admit of the levels below being worked with but little pumping. It will take about two months to do this work, when the machinery will be started up and regular operations of mining and milling resumed. There is good ground opened in the Pittsburg, and the mine was looking very well when it was shut down for the running of the drain tunnel with a view to more economical working in the future. The Pittsburg has been a good bullion producer in the past, and has long life in it yet.

THE MAGENTA MINE.—Grass Valley Union, Jan. 16: The drifts on the 400 level of the Magenta mine, which were started a few days ago, have been extended ten ft to the north and six ft to the south. One "taken up" of ledge has been made in the north drift, and the quartz shows of excellent quality. The quartz that is being stoped above the third level is also of good quality. The rock coming out of the shaft from which the crushing of \$120 per load was made a few days ago, continues to show richly in free gold, and the next cleanup from there is expected to show a fine result. The Magenta is showing up well in its workings, and there is every reason to believe that it is going to develop as a valuable property.

RICH STRIKE.—Herald, Jan. 19: Last Monday a strike of unusual richness was made in the Franklin mine, owned by Hussey & Hussey, at Willow Valley. A blast in the face of the incline uncovered a fine body of ore, from which many exceedingly rich specimens were taken. From three tons of rock were selected three candle boxes of specimens, which, it is estimated are worth at the rate of \$5,000 per ton. The ledge is seventeen inches wide, well defined, and the general indications are most flattering, giving evidence of permanence and continued richness. At the 100 level considerable prospecting has been done with encouraging results, the ledge

being traced upwards of a 100 ft without disclosing the end of the pay chute in either direction. At present the incline is down something over 160 ft. When a depth of 250 ft is reached, another level will be opened and the working force increased.

Placer.

A GOOD CLEAN-UP.—Placer Herald, Jan. 16: George Keehner sent to the mint a few days ago 27½ ounces of gold, the result of a recent crushing of about 20 tons from the New York mine. The New York is an eastern extension of the old Conrad, and for the amount of work done on it has panned out very well.

S. F. COPPER MINE.—Tidings, Jan. 17: We learn from Dr. M. P. Harris, who has just returned from Spenceville, that a new vein of copper ore has been struck in that shaft of the San Francisco copper mine at that place. The old vein had been worked out, and a shaft started which is now down 180 ft. The new vein is said to be richer than any heretofore found in this part of the country. The hoisting engine at the mine was broken last week, and in consequence, the employees will remain idle until repairs can be made.

A RICH CRUSHING.—Grass Valley Union, Jan. 17: The first crushing of quartz from the Magenta mine was cleaned up at Sothorn's mill on Tuesday, and the result was \$480 from four loads of rock, or \$120 to the load. The rock was taken out by tributaries, who although they expected a fair yield were astonished at the going up to such splendid figures. The Magenta stockholders were feeling very good over this "prospect" yesterday, as they saw visions of coming richness in the mine that gives such good promises.

THE NORTH STAR MINE.—Grass Valley Union, Jan. 16: On the authority of one of the owners of the North Star mine, it is stated that the famous old mine will be started up again during the present year. The mine, first and last, was a big producer of gold, and in the last month of its operations paid more than expenses, and why it was shut down "is something no fellow can find out." There is plenty of new ground in the location that has never been worked, and it is the common belief of working miners who are acquainted with the mine that it is yet a valuable property.

Plumas.

ENCOURAGING.—Greenville Bulletin, Jan. 19: At the Gold Stripe a very encouraging prospect has been found in the Bidwell tunnel. This is a part of the ground that has not before been prospected. In the Green Mountain tunnel the character of the ground has been changing for some days past, and is now of that appearance which indicates that the Blake chimney is not far off. Two weeks or so more and the vault will be opened, the treasure got at. At the Halstead mine, Rich Gulch, the tunnel has not yet reached the ledge, though the face of the drift is beyond where it was expected to be found. At their claim near Soda Bar, John Riddle and his partner have plenty of water to work with, and are running steadily. They have now been piping for some time, and are satisfied with the result. They worked very hard to get ready for piping; all of their material, their pipe and lumber for flumes, they carried on their backs not less than two miles over a country where neither horse nor mule could go, two men taking one piece of pipe at a time and making four trips each day.

EAST BRANCH.—Plumas National, Jan. 17: From a letter received a day or two ago, we take the following mining notes: "Most of the claims are idle for the want of water. Brooks' mine is the only one at work. Gifford and Doe Leonard, at the mouth of Deadwood, are in about 70 ft with their tunnel. They are in lava and are hunting for an old gravel channel, which they expect to find this spring. They are well prepared for work, and intend to stay until they do find gravel. The tunnel in the Halstead mine is in 270 ft, but has not yet cut the ledge. Will send you an item occasionally when anything turns up."

Shasta.

GOOD.—Shasta Courier, Jan. 19: The twin quartz edges owned by Frank Yung and partners, located at Quartz Hill some time ago, continues to show the golden glow, and is indeed a bonanza. The owners are the lucky miners of the season so far, and at last accounts were hiding in a tunnel on account of it being Leap Year and the attractions which wealth has for the crinoline persuasion.

Sierra.

A PROMISING CLAIM.—Mountain Messenger, Jan. 19: Bald Mt. Extension Co. have 36 men employed, and over 2,500 carloads of pay gravel in their large dump, presumed to be worth at least \$6,000. The cleanups thus far this month have amounted to near 200 ounces. The main tunnel is now in the lava flow over 200 ft, and is being steadily pushed ahead by the contractors, S. Stephenson and W. Deeds. The general belief here now is that on the other side of the lava the lead will be found on the Extension ground, near which, as the channel is worked in the South Fork, the richest gravel is being taken out. In gangway No. 4, water has been tapped, caving part of a breast, and unsettling the gangway timbers, deemed an evidence of near proximity to the lava flow. A two-ounce nugget was found in one of the breasts the other day, and another was picked up in the sluice of the large dump last Monday. The gold from the South Fork since the lead was found bending in there from the Extension, April 30, 1883, to the close of the year, eight months, has been over 3,055 ounces, and sold to Charles Heintzen for \$18.60 an ounce, \$56,834.70, averaging a little over \$2.60 per carload. Pay roll, \$25,873.61. Dividends, \$18,949.85. The works are in first-class order, and kept in good repair. The main tunnel is in near a mile, 3,400 feet of which is in an air-line, except a slight bend to the left a short distance below where it turns up the ridge. The trains of a dozen cars or more are hauled out by mules. The lava flow, now being crossed by the main tunnel, covers what is undoubtedly the extension of the Ruby channel, of which there must be at least 2,000 feet on the Extension ground, that will probably be in time developed with an incline. Pieces of decayed trees are daily found in the lava, and last week some cedar bark was disclosed, natural to life. Under the able direction of Superintendent W. Lawry, and his efficient night foreman R. P. Mott, this valuable mining property, one of the most promising in the gold belt, is being thoroughly developed

in a systematic and economical manner, creditable to the management and stockholders.

COLUNBO.—Downville Tribune, Jan. 17: At the mine there is only a little snow lying in patches here and there. The mill will be cleaned up to-morrow. Up to that time 350 tons of ore will have passed through the batteries. The plates both inside and outside of the screens are showing up splendidly and the result of the first clean-up is pretty sure to prove even better than had been counted upon. The sulphurets that come from the Frue concentrators assay from \$687 to \$703 per ton. The percentage of the sulphurets yield will doubtless increase as depth on the ledge is acquired and from their rich character will eventually play an important part in the product of the mine. A little trouble has been occasioned by the scarcity of water for milling purposes, but this will be obviated shortly as the flow of water from the lower tunnel increases. The lower tunnel is going ahead toward the vein which will probably be reached ere many weeks longer.

RUBY.—The Ruby Co. have forty-four men employed. Two inclines are down, and three breasts being worked. The west rim of the channel has been found, and the lead crossed 150 feet in search of the east rim. There is sufficient water to wash all gravel taken out, so rich in the breasts and gangways that gold is easily seen in it most everywhere. Pay loads average each about \$2.50. Pay gravel averages two and a half feet in depth. A large force will be put on soon as water comes. Snow is fifteen inches deep at the mine. Clean up last week was 55 ounces and 2 penny-weights, and the one before, 41 ounces. Under the able direction of Supt. J. Colman this valuable mining property is being thoroughly developed, and promises to prove a most remunerative investment for its fortunate owners. The pay roll for December amounted to over \$2,000.

The Bald Mt. Co. have one hundred men busy in their mine and the dumps are well filled with gravel, awaiting water. H. W. Wallis, Supt., anticipates a good clean up.

Trinity.

CLEAN UP.—Shasta Democrat, Jan. 17: Day & Moore, of the East Fork ledge, made a very encouraging and handsomely clean up at their claim the last of this week. From H. Meckel, who had just returned from there, we are informed that out of nine tons of rock they realized over \$900. They were compelled to quit work, owing to the cold and frosty weather.

PAID WELL.—Journal, Jan. 17: Henry Meckel tells us that Day, Moor & Hubbard, on the East Fork, made a clean-up last week after running their arrastra seven days, and that they took out enough to pay all expenses for the season. The quantity of rock crushed was about nine tons, and that it yielded at the average rate of \$100 to the ton. This is a working test that proves the richness of East Fork quartz, and will result in stimulating prospecting in that district. It is a promising held.

DEADWOOD ITEMS.—A correspondent at Deadwood furnishes the following items from that section: "This camp is very lively at present, as all the arrastras are running and the steam quartz mill is hammering away again. The mines are all getting out quartz, and some of them very rich rock. Mr. and Mrs. Lambeth have returned from the city, Mrs. Lambeth having been absent at the East for about three months on a visit among relatives and friends, and says she enjoyed the trip very much. Mr. Murdock has returned, paid off his hired men and a portion of the purchase money on the Philip's mine on the French gulch side of the mountain."

Another correspondent writes from this section as follows: "The old mines being worked here are well known to be rich, so it is useless to speak about them. I visited a mine yesterday owned by Jacob Paulsen and Alex. McGregor. The latter gentleman kindly showed me through the mine and prospected some of the rock which was 'way up.' M. Chudbourne and a man named Cox have a good prospect in a vein of quartz about four inches wide, just above Paulsen & McGregor's mine. Mr. Cox is about to bond his mine, which is a late strike, to W. L. Roberts, of Oakland, who was on the ground to-day. Mr. Kelly has good rock in his mine with a four-foot ledge. Mr. Collopy has a very rich vein, though small, but it is getting larger as he goes down. The Isola quartz mine, owned by Isola and Frick are driving in their tunnel which is expected to reach the big bonanza the last of the month. The Mountain Chief, owned by Weldon and supposed to be an extension of the same ledge on which the Isola is located, has a fine prospect and will commence to open up in a few days. Wm. Blagrove has a good prospect on an extension of the Frick & Davis mine."

Tuolumne.

QUARTZ.—Tuolumne Independent, Jan. 19: Mr. James Tulloch and sons have several good quartz claims on the Brown's Flat slope of Bald Mountain. From one which they are now developing they have taken between \$11,000 and \$12,000, and it is now paying well. The chute is 175 feet in length. The shaft is 200 feet in depth, and they are still sinking on the vein, which is from six inches to two feet in width. A milling vein on the other side of this prospects well and is doubtless very valuable. Neither of the claims are for sale, which gives force to related facts.

NEVADA.

Washoe District.

GOULD AND CURRY.—Enterprise, Jan. 19: The Bonner shaft has been put in good repair down to the 1200 level. At this point the main north drift will be cleaned out and repaired up to the Con. Virginia line. The shaft will be repaired all the way down.

ALTA.—They are now about ready to resume work in the face of the east drift on the 2150 level at the point where it was dropped at the time of the flooding of the mine. This work will be followed with great interest by all the mining men.

UNION CON.—The main north and south drifts on the 3100 level are nearing each other, at the rate of over 50 ft per week. The sound of the drill working in the face of one drift can be faintly heard in the other, though there is a great breadth of rock between the two points.

SIERRA NEVADA.—The northeast drift on the 3100 level is making good progress, and the face is still in ore of low grade.

MEXICANS.—General repairs are being made and

the mine is being put in thorough working order from the 2500 down to the 3100 level. By the time the connection is made in the drifts on the 3100 level of the Union Con. they will be ready for active prospecting operations.

BEST AND BEGHER.—The ground in the bottom of the joint Gould and Curry mine below the 2500 level is still very soft, and requires close watching and timbering.

ORRICK.—The usual amount of ore is being extracted on the 150 level, and the winze is going down at the rate of over 20 feet per week.

CROWN POINT.—Owing to the low stage of water in the Carson river, the freezing up of the wheels of the mills, and other troubles, a full force of men can not yet be put to work in the mine, however, all the ore that can be crushed is being extracted.

HALL AND NORRIS.—The winze below the 2700 level is fast nearing the 2800 level, where a station will be opened and prospecting commenced. The material at the bottom is of a very favorable appearance.

COMBINATION SILVER.—The new hydraulic pump continues to give perfect satisfaction. During the past week the air compressor has been thoroughly overhauled and is now doing excellent work.

UTAH.—The northeast drift on the 1750 level is being advanced at the rate of over 40 feet per week. The quartz in the face is improving and is now giving low assays.

Bristol District.

TEMPER. *Pioche Record*, Jan. 12. The Temper mine of Bristol district has been relocated. This is one of the best, if not the best, mines in the district. There are many hundred tons of a fair paying quality of ore in sight, and it was the principal mine in the series formerly owned by the Gilmer & Salisbury Co., but which has recently been changed to the Iron Silver Co. Two men were sent to the mine for the purpose of doing assessment work, but instead of working on the Temper, they worked on the adjoining claim, known as the Red Cloud. On the 2d of January, old Uncle Abe Rickard relocated it, and he has a perfect title.

Eureka District.

LOCAL NOTES.—*Sentinel*, Jan. 17: Waters & Co. are shipping quartz ore to the Richmond furnaces for flux. The fourth of July mine has been leased to George Andrews and brother. The Clipper mine on Home Ticket Hill is producing ore carrying from 20 to 50 per cent lead. The tributaries in the Hamburg mine are still successful, and are making dividends for the company. It is understood that the E. & P. R. R. Co. will make special rates for ore to Salt Lake. Martin Planton has made another strike in the Dead Broke, the richest ore ever found in the mine. Messrs. Lane and Jenkins have struck a body of rich ore in the Excelsior mine, which they leased lately. The rich ore streak in the North Addition Chamber of the Eureka Tunnel, gives evidence of still further improvement. The prospects for pay ore in the Uncle Sam mine, on Peelsick Hill, are very good—red lime and iron showing up abundantly. Much of the preparatory work at the Connolly mine has been completed, and the resumption of developments will shortly take place. The 200-level of the Eureka Tunnel is in a fine prospecting condition, and if a force of men were employed it would very probably show up a good deal of ore.

Highland District.

HAMBURG.—*Pioche Record*, Jan. 12: This old abandoned mine, which has not been touched for years, with the exception of having several years' assessment work done on it, which is located in Highland district, and was purchased by the Day Co. for \$150, has come to the front. Two men, after the purchase of this mine, were placed at work prospecting, and in running a drift from the bottom of the mine, encountered a vein of ore nine feet in width. The assays from this ore go as high as \$150, but we are of the opinion that the assays were made from the best of the ore. The ore vein is nine feet across—strong—and the ore will average, it is thought, fully \$40 per ton. If work was only done on a number of the old abandoned claims along the range between Pioche and Bristol, there would be a number of valuable mines opened up. If the prospectors would do more work and less talk, their fond anticipations might be realized.

Schroeder District.

THE NEW MINES.—*Elko Free Press*, Jan. 19: Professor Birner and Mr. J. E. Gilligan have been on a prospecting tour over in Schroeder district, about twelve miles west of Carlin, and report the outlook fine for a good camp as soon as the snow leaves. There are two mines, the Comstock and Grace Darling, being worked by a Chicago company. The latter has a fine body of ore in sight, with over 500 sacks on the dump, and one man is taking out 40 or 50 sacks daily. Part of this mineral belt lies in Elko county, and the line should be established as soon as possible, so that prospectors will know where to record their claims.

Tuscarora District.

WILL. CLOSE, DOWN.—*Times Review*, Jan. 14: The Grand Prize mill will close down some time this week, or as soon as the stamps catch up with the ore dump. The supply of fuel has been reduced as low as the Supt. considers it safe, in view of keeping a sufficient quantity on hand to run the hoisting works during the winter season. The work of extracting ore from the stopes will be continued and new ground opened, preparatory to another run when the supply of fuel is renewed.

White Pine District.

HAMILTON'S PROSPECTS LOOKING UP.—*White Pine News*, Jan. 16: The latest advices from Hamilton are that the mining outlook for the coming season is brighter than for years past. Mr. J. R. Kendall, since his return, has put a force of men to work on the Jennie A. and talks of starting up a furnace by the 1st of April. It is also believed that E. N. Robinson will resume operations on the Sweetwater Co.'s mines early in the spring. All of which prospective good fortune we hope our neighbors will have in due time.

ARIZONA.

PINE SPRING MINE.—*Prescott Courier*, Jan. 14: J. M. Roberts, one of the owners of the Pine

Spring mine, is in Prescott and says that it is the intention of himself and partners to procure hoisting machinery and go down deeper in the mine. They are now tunneling and propose, when they feel like using some more cash, to take out several tons of high grade ore.

QUINTOAS.—*Cor. Los Angeles Times*, Jan. 13: The sale of the Quintoas bonanza mines to Messrs. Mackey and Flood has caused an undue excitement, and many people are acting without reflection and hastening there as if every hill contained a vein of precious metal and a thousand capitalists were waiting to buy every location. It is true that some facts about this 12,000-acre sale are encouraging. The ore is rich. The smelters have given returns of \$8.50 per ton, on the average. Assays run from \$250 to \$1,100 per ton. Any of the rock of the bonanza hill will go \$53. It is true that the bonanza companies will put up mills and work these mines and employ a great many men, and that another Virginia may arise on the new Comstock. There is another side to the question. There is only one bonanza hill, and it is all owned by one company. It can only be climbed in one place, and that place is guarded. The ore is free milling and easily worked. W. C. Davis, one of the original locators and a part owner, says that at the utmost there will not be over 200 men employed on the hill, and not over 100 by next summer. Thirty men are at present all there are employed, and they are digging a trail up to the mines. Then there is the water question, which is yet to be settled. The Bonanza company is boring, but it has not struck water yet. Another serious question is that of wood. This supply is very limited in the immediate vicinity, being nothing more than the brittle mesquit, that can be chopped with a hoe. As it is, people are rushing to the Quintoas by the fifties and hundreds every day, with bags and baggage. It is a harvest for the hotel-keepers, the freighter and the corral man. There is nothing else to do but prospect, and the hills are already full of keen-eyed men searching for minerals. There is nothing to employ the great crowd, who are rushing there "a little too previous." Many cannot afford to wait, and others will consume their little capital in waiting. All cannot get employment, and all cannot get bonanzas. A majority will get borascas instead, and then they will return sored, and "give the place a black eye." The way the people are coming here shows the character of the Pacific coast has not changed in the past 35 years, and that its people have not profited by the Gold Bluff, Frazer river, Boise, Washoe, White Pine, Panamint and a dozen other wild-goose chases after phantom fortunes.

COLORADO.

COAL.—*Register-Call* Jan. 12: The output of Colorado for 1883 is estimated at 1,114,040 tons. Of this amount the Welch mine at Louisville is credited with 103,321 tons, the mines at Langford with 45,000 tons, and those of Erie and Canfield are lumped at 80,000. This would make Boulder county's coal output a trifle less than 200,000 tons, between one-fifth and one-sixth of the entire state, and this at \$2.25 a ton foots up \$450,000.

GOLD.—The first shipment of gold retort made by the banks of the city for 1884 was made by the Rocky Mountain National Bank, amounting to \$3,500. The shipments for next week will be large, as there is considerable gold held over, and that coming in will help to swell the aggregate.

HUBERT.—The lessees of the Hubert mine, Nevada district, received for a car-load of smelting ore shipped to Denver a few days ago \$45 per ton net, an advance of \$20 per ton over former prices. The mill dirt treated at the stamp mill in Black Hawk for the month of December 1883, gave an average yield of 5 ounces gold per cord. Mill men treating the ore report that the plates are looking much better, and the average for the present month is anticipated will be 7 ounces per cord.

IDAHO.

FROM SPOKANE.—*Cor. Bedrock Democrat*, Jan. 10: I have started for the mines and have turned back on account of a snow storm. I am very glad I came back for I was not very well prepared for a trip of that kind. I went as far as the agency and could not get any one to pack grub in to the mines for any price. They are asking 25 cents per pound for packing. Everything is 75 cents per pound in the mines and scarce at that. Diggings as rich as mud. No discount on the mines and lots of ground to be worked.

COEUR D'ALENE.—*Helena Independent*, Jan. 13: John H. Brown who has just arrived from the Coeur d'Alene mines, says that at present they are inaccessible, except to pedestrians, and even then the trip is one fraught with suffering and danger, the snow being very deep on the ranges. There are now about 500 men at Heron siding waiting an opportunity to go into the mine. There are also a good many men at Rathdrum and at one or two other points, from which it is expected that trails will be opened. About 200 men are wintering in the camp. Every article of food is high, flour and bacon selling at almost any price that may be asked, and other things in proportion. The twenty-acre claim rule has been broken up, and now all that one claimant is allowed is a one hundred foot strip, extending across the gulch, which is about 50 yards wide. The ground is so flat (the fall being from only one to one and a half inch to the rod) that shieling is impracticable. Mr. Brown regards the Heron Siding trail as a very dangerous one for stampedeers to attempt to follow, at least until the snow is all gone and the trail is thoroughly opened. Many persons have tried the Heron trail, but generally have failed and had to come back and go round by the way of Rathdrum and Fort Coeur d'Alene. The Heron trail has never been free from snow, and at present the snow is from three to ten feet deep. The distance across is not so great, for at times the tooting of the locomotive can be heard at camp; but the ruggedness of the country and the heavy growth of timber (which keeps the snow from melting till far into the summer) render it a very undesirable route to get to the mines. Some assert that a good trail can never be opened from there. On the contrary, the route by way of Rathdrum is generally almost free from snow, except in the severest weather. A small steamer, now being built, will operate to the mouth of Eagle creek, but this will probably only last during the spring rise. During its continuance this route will doubtless be the favorite one. Notwithstanding the depth of snow there are more people still going into the mines than

are coming out, but it is unwise for those intending to go to risk the hardships of the winter trail. Shortly before Mr. Brown left, new and rich diggings were reported to have been discovered in Fourth-of-July canyon, and other localities are being prospected as fast as the weather permits. Miners generally expect a big boom in the spring.

STRIKE AT LAST.—*Wood River Times*, Jan. 16: The gratifying news comes that the miners working in the Mount View mine, near Bullion, struck the ledge last week and found it to carry a vein of solid galena from one to two feet wide, which carries from 600 to 700 ounces of silver per ton. The ore is exactly the same character as that of the great Bullion vein, but it is of much higher grade in silver. The Mount View claim was located over three years ago, by Barney Quigg and Dan Colman; Judge McBride and Moses Hirschman, of Salt Lake City, were also interested. These gentlemen afterward bought out Mr. Colman, so that they became the sole owners with Mr. Quigg. They then began prospecting, and have since expended all of \$20,000 on the claim, with but insignificant returns. Now that they have struck ore, however, they will doubtless be amply repaid for their outlay.

MONTANA.

NOTES.—*Inter-Mountain*: Doc Larkin has a force of men at work on the Bob Ingersoll lode, and the shaft is down twenty-five feet. The water is coming in fast and a night shift will be put on this week. The lead gives promise of being rich and is the property of Doc Larkin and Ed. Stack.

On the Ramsdell Parrott ore is being raised from the stope on the 200 level. About thirty tons are hoisted daily with a whim. The main shaft is down 300 feet. East of the main shaft another shaft, six feet across, is being sunk on a body of free-milling ore, which is to be tried this week at the Dexter mill. Samples all the way across give a return of eighteen ounces. The copper ore is still being hauled to the Montana Copper company's smelter.

QUARTZ DISCOVERIES AT WASHINGTON GULCH.—*Helena Independent*, Jan. 10: Robert Hodge, of Meadow Creek, says that the find of rich quartz made on the head of Washington gulch last fall promises to cause quite a stampede there in the spring, and it is thought by those competent to judge that some rich developments will be made as soon as the irrepresible prospector can get in in the spring. As the find is above timber line no prospecting can be done at present.

BUTTE.—*Miner*, Jan. 12: To one unaccustomed to the scenes of activity which constantly prevail upon the now snow-clad mountain spurs, lying north of Butte, the busy aspect which they now present would prove a surprise. The hills and gulches are crossed in every direction by well broken roads, which wind about the various properties, crossing intersecting and diverging from each other in a thousand different directions, while hundreds of heavy teams laden with wood, mining timbers, lagging and other supplies wind along their course. Upon every hand, in every gulch, on every spur and apex, may just now be seen the claim owner of abiding faith, patiently engaged with shovel, pick and barrow, doing the assessment work which Uncle Sam exacts as the condition of holding the claim which is some day to become a great mine.

The great south vein ore body of the Alicer mine, which has been developed in the east drifts from the one, two and three hundred-foot levels, was penetrated last week in the 400-foot drift, where it shows width of three and a half feet. The south vein is one of the most reliable and uniform ore shoots ever developed in this district. In each of the upper levels it has been stripped for a horizontal distance of from 350 to 400 feet and explored by winze to the level below and has been found throughout its entire extent to maintain its uniformity of and width grade.

The Lexington mill continues its steady run and satisfactory output, opening the ball for the new year with a shipment of \$42,304 last week! At this rate the lucky Parisian stockholders may expect another \$250,000 dividend in the near future.

Active operations are continued in the northwest drift from the 100 of the Bell. The new strike improves in width and grade with development. It is expected that the smelter will be started up on ore from the stopes of the 400 in a few days.

NEW MEXICO.

KINGSTON.—*Herald*, Jan. 10: We had the pleasure of again visiting Kingston and spending a couple of days there last week. The lull after the activity which preceded the new year, due in part to the general working of assessments, caused the merchants to speak of it as dull by comparison, yet there is everything to encourage the people, whether business men or miners. The town has grown some and a number of new buildings are in course of erection, while many others have been added to or improved. The mines of the camp are its hope and its chief reliance, and their condition is one of steady improvement. It is the output of a mine which attests its value, and according to its age Kingston has more actively producing mines than any camp in the Territory; indeed, we are not certain if it has not more than any camp of any age. The Bullion is showing steady improvement. The hoisting of ore has been in large part suspended while they have been sinking and upraising a large double compartment incline as a working shaft. Connection was made in it on the 31st, and the entire shaft is opened and timbered to a depth of 134 feet. The machinery was arriving on the ground and the boiler was being set at the time of our visit. On the Superior, development is progressing steadily, as heretofore. The incline has reached a depth of 300 feet, and a station has been excavated preparatory to drifting. The output of ore from the 200 level is just about the same as for the past six months, or about a car per week of the shipping grade.

BLACK RANGE NOTES.—*Lake Valley Herald*, Jan. 16: First-class miners are in demand in the Range. The last of the concentrator machinery is on the ground. The owners of the White Signal are getting out concentrating ores. Brad Williams, Superintendent of the Ivanhoe mine, has gone East to confer with the new owner of the property as to the best policy to pursue regarding it. The people of Grafton live in hopes that some work will be done upon it now and its present evil reputation contradicted. The Ivanhoe mine, sold at Sheriff's sale last month, brought \$3,200. The sale was made to J.

D. Brooks for J. B. Allee, of Boston, who held a deed of trust on the property for \$50,000, which was given to raise funds for working.

STRIKE.—A large and rich strike was made a few days ago in the Cincinnati mine in Tres Hermanas district. This mine is shipping ore to Socorro and Benson, and the owners are realizing handsomely therefrom.

ROYAL ARCH.—Rush Rowe, of Grafton, is in the city, and reports the Royal Arch mine down 225 ft., and showing a two-foot pay streak which will average \$30 a ton. The concentrator at Chloride will start in about sixty days.

OREGON.

NOTES.—*Jacksonville Times*, Jan. 18: Miners looking blue. Curtis Bros. have everything in good shape for effective work on Jackson creek. Quite a number of prospectors, some of whom had from California, are prospecting in Blackwell district. Capt. Kelley, having been put in possession of the Cayote creek mines, will commence active operations as soon as the cold weather is over. Wm. Clark, of Alt-house, Josephine county, whose claim has yielded a number of large chunks of gold, picked up a \$25 slug the other day. The prevailing weather is quite unfavorable for the miners, who are able to do little, if anything. It is hoped that the cold snap will speedily come to an end and give them a show.

UTAH.

STRIKE IN SILVER MOUNTAIN.—*Salt Lake Tribune*, Jan. 19: A letter has been received from the foreman of the Silver Mountain mine, which confirms the report brought by a miner a few days ago, of the discovery of a new ore body. The strike is the most important yet made, and the ore is of even better quality than any yet found in the mine. No ore can be hauled at present, but when regular shipments are begun in the spring there is every reason to expect that the mine will take rank as one of the foremost of our ore producers.

FRISCO.—*Southern Utah Times*, Jan. 19: The Carry Lode mining property is situated near Lober's Canyon about a mile and a half from town. The vein is a true fissure in a limestone formation. The main working shaft is now down to a depth of 40 ft., and follows the ledge, which dips west at an angle of 45 deg, from the perpendicular. The ore is a vein of clean ore running through the ledge, which has an average width of 12 inches. A drift is being run into the ledge at the bottom of the shaft, which is now in a distance of ten ft., exposing a fine body of ore. The ore is carbonate mixed with chloride of silver, and assays 70 ounces of silver and trace of gold. The ledge can be traced on the surface for a distance of several hundred ft. The *Record* man of Beaver visited the famous Cave mine the other day, and was much gratified at seeing the many evidence of improvement there. Among the many changes is the 500-foot tramway and the magnificent new hoisting works, machinery for which is now all on the ground. The large sum of money invested in this machinery, etc., shows that the owners of the Cave mine have faith in the permanency and profitable nature of their property, and well they might have, for it is truly a bonanza. Godbe, Chambers & Co. are pushing work on the Summit mine, which they have bonded from Guio and others. Taking Bradshaw district as a whole, it is pretty safe to assert that there is an exceedingly bright future in store for it. While the neighboring district of Lincoln has a somewhat unenviable name for tardiness, yet it is now looming up, the Croft brothers, especially, showing some exceedingly fine developments in their several mining properties. They are running both a night and day force of men, and I am informed, have already expended some \$10,000 in development with encouraging results. Success to them and all others who are developing the country. These mining camps will, and I might say, are giving Minersville a market for all its surplus farming products.

STAR DISTRICT.—*Southern Utah Times*, Jan. 13: Star district, the monarch mineral bearing belt of Beaver county, is a low and somewhat isolated range, situated five miles southwest of Milford, and about nine miles southeast of Frisco. The range is seven miles long and three miles wide. The trend is north and south. The formation is limestone and quartzite, resting on granite at an angle of 45 deg. The limestone is of the carboniferous age, while the quartzite to the west is silurian. It is remarkable, even in a rich mineral country, for the number of outcrops and the plentiful distribution of ores all over the district. Up to the present date it has produced about 1,000,000 tons. For the last five years it has taken a back seat as far as the production of bullion is concerned, but not so as regards prospecting. More cutting is being done to-day in Star district than in all the rest of Beaver county. The results are necessarily slow on account of the number of mines, the scattered territory and the amount of men never exceeding 25 or 30, but they are veterans, grizzled and wrinkled in their long and protracted struggle to bring out the district. At the present writing the camp never looked more favorable, there being not a vacant piece of mineral ground in the district. The Wild Bill and Flora has shipped 1,000 tons of ore. The Stalwart is patented. The Talisman shows 1200 ft. of cutting in shafts, drifts and tunnel. Among the other mines are the Uranus, Boston, Kanarra, a true fissure vein, shipped 120 tons of ore last year, Harrisburg, Mountaineer, Kemple, Monitor, Bismarck, St. Mary's, Waukegan, Big Bonanza, Creedmoor and the Magnolia, which shipped 50 tons of 40 ounce ore last month. The Wasco 850 ft deep, is also one of the good properties of the district, that will, before long, make itself known to the outside world.

Bullion Shipments.

Hinaver, Jan. 16th, \$2,342; Crescent, 16th, \$2,450; Ontario, 16th, 8,426; Horn Silver, 16th, \$6,000; Ontario, 17th, \$4,080; Horn Silver, 17th, \$6,000; Hinaver, 17th, \$2,440; Stormont, 17th, \$3,364; Ontario, 18th, \$4,185; Horn Silver, 18th, \$6,000; Ontario, 19th, \$4,151; Horn Silver, 19th, \$9,000; Syndicate, 14th, \$6,792; Navajo, 21st, \$7,000; Belmont, 15th, \$2,362; Contention, 19th, \$17,549.

For Mining Shareholder's Directory, Stock Reports etc., see page 80.

Mining Assessments in 1883.

So far as advised, 148 mining assessments became delinquent at the offices of the respective organizations during the year 1883. The list covers the dependent mines in California, Nevada and Arizona, besides a few in outlying Territories. The mines are as follows:

Mines.	No.	Amount.
Alaska	2	\$14,000
Alexander	1	50,000
Alhambra	1	7,000
Alpha Hydraulic	1	3,000
Alhion Consolidated	3	169,000
Alta	3	81,000
Andes	3	75,000
Argenty	3	80,000
Athletic Consolidated	1	5,000
Baker Divide	1	2,000
Bald Mountain	1	3,000
Bechtel Consolidated	1	26,000
Belcher	1	7,500
Belmont	1	100,800
Best & Belcher	1	32,400
Benton Consolidated	3	25,000
Belle Isle	1	25,000
Bodie Consolidated	2	100,000
Bodie Tunnel	1	40,000
Boston Consolidated	1	25,000
Bryant	1	750
Bullion	2	40,000
Calaveras	1	500
Caledonia Gold	1	10,000
Caledonia Silver	1	20,000
California	3	324,000
Cariboca	1	10,000
Campo Seco Copper	2	15,000
Challenge	1	50,000
Champion	1	9,000
Christy	1	12,000
Chollar	2	168,000
Columbus Consolidated	1	25,000
Confidence	1	6,240
Commonwealth Consolidated	1	2,500
Consolidated Anador	3	45,000
Consolidated Imperial	2	50,000
Consolidated Pacific	1	9,000
Consolidated Reforma Lead	1	4,500
Consolidated Virginia	1	108,000
Car	1	500
Day	2	60,000
Detroit Copper	1	5,000
Double Standard	1	5,000
East Mount Diablo	1	5,000
El Dorado	3	15,000
El Dorado Gravel	1	5,000
Elko Consolidated	2	30,000
Equitable Tunnel	1	10,000
Eureka Consolidated	4	200,000
Eureka Smelting	1	3,000
Eureka Tunnel	1	50,000
Excelsior	1	20,000
Excelsior Deep Gravel	2	32,500
Excelsior Water and Mining	2	25,000
Fair Villa	1	10,000
Fresno Enterprise	1	10,000
General Miller	1	1,000
Genesee Valley	1	4,000
Germania Lead	2	30,000
Golden Pledge Gravel	3	11,500
Gold Lead	1	5,000
Goodshaw	1	10,000
Griffin Mill	2	15,000
Gold & Curry	3	162,000
Grand Prize	3	75,000
Grand View Con	1	4,000
Hale & Norcross	4	224,000
Hamburg	1	25,000
Harrington	1	5,000
Hazard Gravel	1	15,000
Henrietta Gravel	1	2,000
Hogden Mill	1	2,000
Holmes	2	60,000
Homer Mill	1	10,000
Homeward Bound	1	25,000
Hope	1	250
Horseshoe	1	2,000
Independence	2	60,000
Jamestown	1	1,000
Jeanette	1	750
Julia Consolidated	1	21,000
Justice	2	1,000
Lady Washington	1	5,400
Lima Consolidated	3	15,000
Loretta Mill	2	25,000
Lucky Hill Consolidated	1	10,000
Mariposa Land & Mining	1	25,000
Martin White	3	75,000
Maryland	1	750
Mayflower Gravel	3	29,000
Mayflower Silver	1	7,000
Matamoros Consolidated	1	3,500
McClinton	1	3,000
McElroy Gravel	2	15,000
McMillan	1	20,000
Melones Consolidated	1	2,500
Mexican	3	252,000
Monro	1	10,000
Morgan	1	30,000
Mt. Auburn Quartz	3	30,000
Mt. Potosi Consolidated	2	50,000
Napoleon	1	5,774
New Cosa	1	1,770
North Belle Isle	2	40,000
North Gould & Curry	2	55,000
Noonday	1	100,000
Omikak	1	15,000
Ophir	2	252,000
Oro Mill	1	10,000
Original Keystone	1	30,000
Pacific Mill	1	2,500
Pleasant Valley	2	30,000
Pittsburg	2	30,000
Potosi	3	140,000
Red Cloud Consolidated	1	100,000
Red Hill Hydraulic	3	15,000
Rocky Point	1	15,000
Roma Union	1	2,000
Ruby Gold	1	2,500
San Miguel & La Trinidad	3	150,000
San Pedro	1	5,000
Savage	3	168,000
Scorpion	2	20,000
Senator	1	10,000
Sierra Nevada	3	300,000
Silver Hill	2	10,000
Silver Hill Quartz	1	10,000
Silver Link Consolidated	1	5,000
South Hite	1	3,000
Star	2	20,000
Summit	1	1,000
Swansea	1	2,000
Sulphur Bank (Quicksilver)	1	75,000
Tip Top	3	5,000
Tower Hill	1	3,000
Trinity	1	5,000
Union Consolidated	4	250,000
Utah	1	9,000
Virginia Consolidated	1	25,000
Wales Consolidated	1	1,000
West Branch	1	20,000
White Awake Prospecting	1	25,000
Whitethrop	1	8,000
Yankee	2	10,000
Young America South	1	10,000

We do not assume that the above assessment

money has all been collected, for in some cases we know there was an utter failure to collect a dollar, and in many other cases only partial collections are understood to have been made. Here is an instance in point where there was no money collected. The Noonday, North Noonday and Red Cloud Consolidated mines in Mono county, California, were heavily handicapped with debt upwards of a year ago. The Noonday mines had produced considerable bullion, but not enough to pay expenses of production and development. Each of these three mines, feeling it was a case of life or death with them, levied an assessment of \$100,000 last January. We understand that not a dollar of that \$300,000 was ever collected. The mines and property connected therewith were subsequently sold by the Sheriff, and bought in for account of the creditors. We believe nothing has been done with them since the sale. How much of the \$75,000 called for by the Tip Top mine in Arizona was ever collected we do not know, but it has been stated that the stockholders have abandoned the mine to the creditors. The Alhion Consolidated and Martin White mines in Nevada have collected but little of the amounts called for during the year.

It is quite probable that many other mines have had equally poor luck in collecting all the assessment money called for. Especially is this true of mines lying in the less important districts. We hazard little in saying that the amount of money paid in for account of assessments this year is the smallest in many years. Stockholders have become weary of these claims, especially as the mines have not been as remunerative as in former years. But for the element of stock gambling, it would be still more difficult to collect assessments. Most of the money called for is from the mines that are listed at the Boards. The large operators in these stocks manage to make enough out of the fluctuations in value to pay whatever assessments they are obliged to, and gather in the remainder from those who hope to become millionaires, but who are as far from the realization of their hopes as when they commenced. Mining is a legitimate and praiseworthy industry when prosecuted for what it is worth and on business principles. Divested of the assessment feature, there would be little inducement for turns in stock, and more concern for the legitimate development of ore bodies. The assessments delinquent this year have been apportioned among the following localities:

CALIFORNIA.			
Counties.	Amount.	Counties.	Amount.
Anador	\$45,000	Placer	\$104,774
Butte	22,000	Plumas	5,000
Calaveras	38,000	San Francisco	2,500
El Dorado	35,000	San Mateo	3,000
Fresno	10,000	Shasta	2,500
Inyo	4,770	Sierra	30,500
Lake	25,000	Triunty	3,000
Mariposa	30,000	Yuba	210,000
Mono	647,000		
Nevada	72,000	Total	\$1,100,044
NEVADA.			
Counties.	Amount.	Counties.	Amount.
Elko	\$372,500	Nye	\$87,500
Esmeralda	100,000	Storey	3,064,499
Eureka	454,000	White Pine	95,000
Lincoln	67,000		
Lyon	12,000	Total	\$4,244,400
ARIZONA.			
Counties.	Amount.	Counties.	Amount.
Cochise	\$87,000	Yavapai	\$76,000
Gila	23,500	Yuma	10,000
Pinal	20,000		
Total			\$165,500
UTAH.			
Salt Lake county			\$40,000
Washington			12,000
Total			\$52,000
DAROTA.			
St. Lawrence county			\$10,000
ALASKA.			
Takou and other counties.			\$20,250
LOWER CALIFORNIA.			
Michigan District.			\$4,500
MEXICO.			
Chihuahua			\$150,000
Sinaloa			25,000
Sonora			18,000

Silver King.

The most famous of Arizona's mines is probably the Silver King. This mine is in Pinal county, and the deposit was first casually discovered by a soldier named Sullivan, then under the command of General Stoneman, now Governor of California. Sullivan never utilized his discovery, and after his discharge from the army disappeared, and was supposed to have been killed by the Indians. Subsequently a party of five set out to find the locality from which Sullivan had obtained the nuggets. They were attacked by the Indians and one of the number killed. The discovery was made by the other four and properly located. After the mine had been opened Sullivan one day appeared as an applicant for work, and was employed. He had lost the chance of making the location for himself.

The four original owners of the mine were Charles C. Mason, Isaac Copeland, Benjamin W. Reagan and William H. Long. Mason and Reagan subsequently bought out their partners; and then Mason sold his one-half interest to James M. Barney. The company was incorporated on the 5th of May, 1877, under the laws of California. The early history of the corporation was attended with the usual obstacles of mining in a new district, distant from supplies. But as soon as matters began to run smoothly dividends were declared. The first dividend was paid in November, 1877, at the rate of fifty cents per share. These were kept up until the following June, when they were interrupted for

three months, after which two more were paid at the same rate. For the next two years our record shows no dividends. However, they were resumed in October, 1880, at the rate of twenty-five cents per share. These were kept up until last July, and again resumed in December. The record of Silver King dividends to January 1, 1884, is as follows:

1877	2	\$100,000
1878	7	350,000
1880	2	75,000
1881	12	300,000
1882	12	300,000
1883	7	175,000
Totals.	43	\$1,300,000

The year 1883 gives but little to report in addition to those preceding it. There has been no change in the mine, mill or management, excepting in the various details of the work from day to day. The main vertical shaft has been sunk something over another hundred feet, and a station put in 100 feet below the 714 level. This level has given most of the ore extracted and reduced the past year, and still continues to do so. The proposed improvements spoken of one year ago have all been completed and are in use. At the mill an artesian well was put down as an experiment and proved successful. The principal proposed additions to the plant the present year are, the introduction of the electric light at the mine above and below and at the mill, air compressors with power drills, including one diamond drill, at the mine, and the sinking of artesian wells at the mill. The suspension of dividends for five months of the year is attributable to short water at mill, bad air and lights during the heated term in the mine, and unusual but necessary expenditures of money in securing claims adjoining, settling of various lawsuits and securing title to property.

The amount of ore crushed at the mill during the year was 22,682 tons, yielding 67 shipments of concentrations of a little over 11 tons each, and aggregating 758 387-2000 tons. Thus, the ore shipped weighed 3 34-100 per cent. of that crushed. The average assay value of the ore as per daily assay was \$42.90, and that of the tailings, which can be determined pretty accurately on account of the presence of little or no native metal, was \$4.89. 2,390 tons of ore are now in reserve in the mill yards. The mine produced \$600,000, and divided among the stockholders \$175,000 in seven dividends of \$25,000 each during the year 1883.

The Cœur d'Alene Country.

Prior to June, 1882, no prospector had penetrated the wilds of the Cœur d'Alene country. In the month and year named, Messrs Gillet and Pritchard discovered a paying property. This first paying claim is now known as the Wyant, Peters, and Price, from the names of the owners. It is located on Pritchard creek, and it was from this claim that a nugget weighing seven ounces, which, devoid of impurities, is valued at \$110, was obtained. The height of the mountains above the basin is about 600 feet. The width of the gulch is about 50 rods, or 800 feet. The fall or dip of the basin is from one and a half to two inches to the rod. The altitude of the district is much less than is generally supposed, and a great deal less than almost any of the hitherto great camps. The altitude above the sea of Lake Pen d'Oreille is 2,000 feet; that of Rathdrum, 2,250 feet; and of Eagle city only 2,300 feet. Cœur d'Alene city has an altitude of about 2,000 feet, the same as Lake Pen d'Oreille. Snow usually commences to fall in the vicinity of Eagle city about November 1st, and continues until the first of April. Work will be resumed April 1st, and continue till the fifteenth of May, when the freshets, incident to the melting snows, will put a stop to mining for a month more. It is liable to be pretty wet. Last season an immense amount of water came down from the hills into the gulches, swelling Pritchard and Eagle creeks into broad and very rapid rivers. People would do well to bear in mind that the area of the district named, which has a length of ten miles, is all that has been materially prospected. The other is not yet sufficiently prospected to enable men to know of its character.

There has been some discussion as to the legal right of miners in the district to hold, under the old regime, 20 acres as a claim. Some have inclined to the belief that under late mining enactments, such claims could not lawfully hold, that in the spring when the throng sets in to the mines, these claims must necessarily be cut down. On this subject Captain Wooden of Eagle City, on being interviewed by a *Telegram* reporter said: "I understand the present United States mining laws to allow a miner, who complies with the usual requirements of location and development, to hold a placer claim of 20 acres. The territorial statute of Idaho and the regulations of the district admit of it. I understand them to be entirely in accord, and I am certain that every effort will be made by present property holders, should there be any dispute in the spring, to hold their claims intact at whatever cost. They went in early and endured much, and they will not relinquish their property in whole or in part, cost what it may. The 200 or more miners now there would quickly resort to arms were any attempt made to infringe upon the locations already made. Should there be any attempts to coerce them under a later regime bloodshed will be the result."

Consolidated Virginia Mines.

No work has been done in the C. and C. shaft during the past year, except necessary repairs. The pumping and hoisting machinery is in good order. The old Con. Virginia shaft continues to be one of the main up-cast shafts for the north end group of mines. In September last a chamber for a joint California winze, No. 2, was cut out, and a winze started down at a point in the joint California east drift 360 feet east of the joint winze down from the 2500. This winze will be sunk to the 2900 level, and connected with the main California south lateral drift on that level, forming a much needed air-way and taking natural ventilation down to that point. As to the 1500, 1550, 1650, 1750 and 1950 levels, it has not been considered safe to attempt the reopening yet, there still being indications of the existence of fire in the old stopes. The Secretary's report shows the receipts to have been as follows:

From assessment No. 19, \$107,707.40; assay office (Virginia), \$873.80; suction fan (Virginia), \$9.50; outstanding last annual meeting, since settled, \$97,168.23; proceeds settlement of bullion worked on joint account with other mines, fiscal year 1881, \$8,455.56.

The disbursements were: Nevada Bank, balance on hand, \$36,643.76; cash in San Francisco office, \$216.35; W. H. Patton, Superintendent, cash in Virginia office, \$1,659.25; Virginia office, \$594.74; hauling, \$68.77; books and stationery, \$291.75; advertising, \$504; water, \$50; hoisting, \$2,619.15; taxes, \$1,500.87; compressed air, \$17,533.52; bullion discount, \$159.93; interest and exchange, \$882.48; legal expense, \$2,324.75; California and Consolidated Virginia shaft, \$79,950; supplies, \$14,293.43; salaries and wages, \$51,103.44; expenses (San Francisco office), \$3,798.30. It will be seen that no bullion was produced during the year. The management has very evidently been economical.

Telephones in Mines.

During a recent mining exhibition in Europe the practical application of the telephone to mining was so undeniably proved that the committee gave the highest award of the exhibition to the company exhibiting the instruments. At two mines where they are using telephones satisfaction is being given. One of them has had six underground levels connected with the shaft surface; thus signals for the rise and descent of the skip, etc., may be given from any level, and should occasion require a signal may be given to the surface indicating that someone desires to speak. This is immediately answered, the conversation is carried on, and where previously two hours elapsed before a reply could be received at the bottom level it is now accomplished in as many minutes. For instance, supposing a miner has received an injury at the 215 level, a companion at once goes to the telephone, which is encased in a water-tight box, gives the signal for conversation, is immediately answered, and communicates to the captain at the surface the details of the accident, and asking for the skip to be sent to the level he names. The injured miner, whose life may depend upon speedy assistance being rendered, may thus be at the surface in ten minutes from the moment of the accident. In various other ways can the telephone prove its great utility to mining purposes, avoiding the repeated inconvenience of the failure of the "knocker line." In Wheel Agar the 125, 115 and 105 levels are brought to one set of apparatus at the surface, and the 195, 180 and 120 levels to a second set, thus allowing any two levels to communicate at the same time. At South Frances two shafts are fitted with telephonic communication; one shaft includes the 120 and 150 levels with the surface, the remaining shaft the 185 and 230 levels. In each mine the Blake and Bell instruments are used. These instruments have been specially fitted for the purpose.

MINING AT LEADVILLE, COLORADO.—In consequence of the heavy decline in lead during the last quarter, the mines of Leadville have not given the grand total anticipated; yet the exhibit is, nevertheless, extremely favorable when all the adverse causes are considered. For example, the Harrison Reduction Works with four furnaces were idle three months, owing to their destruction by fire and inability to procure sufficient ores. The La Plata smelter remained unproductive two months by the rebuilding of its plaus; the Leadville stamp mill lost two months, the Elgin smelter five, the Tahor mill seven, and the Shields seven months. Meanwhile millions of dollars' worth of ore accumulated; some was shipped out, and a large part remained unused. It must be remembered also that the Grant works here and the two large smelting concerns at Pueblo have from 10,000 to 30,000 tons of ore from Leadville which have no part in any of the statements for this year, and which, if converted into bullion, would raise the product of that district to a very much higher total than has been given. Taken all in all the exhibit is the most favorable ever made for the Colorado mines, and is as accurate as great care exercised in the compilation can make it.

THE ENGINEER.

Military Experiments in Snow.

A party of officers have ingeniously utilized snow in order to observe the effect of long-range firing. They selected a flat piece of ground upon the flanks of the Mont de Baumer, covered with snow, upon which they marked out a rectangle 230x98½ feet, representing a battalion in double column. In the middle of this they planted two flags. The artillery were placed at a distance of 1,748 yards, at an elevation of 282 feet above the target. Six officers then fired 300 rounds, aiming one-third at the central flag and the other two-thirds more to the left, in order to make allowance for the high wind then blowing. The snow showed clearly where each shot had struck, and in this manner it appeared that 78 per cent of the projectiles had fallen within the *enrante*. An experiment of a different kind was made to calculate the resistance opposed by snow fortifications to cannon shot. A wall was erected 16½ feet long and 5 feet high; the back was formed of one-half inch planking, and the front of snow in varying thicknesses. It was divided into three distinct sections, in the first of which the snow was 4½ feet thick, in the second 3 feet 3 inches, and in the third 20 inches in depth. Twelve shots were fired against the first section, at ranges of 246, 328 and 437 yards, but none of them traversed it. Shots fired from distances of 246 and 328 yards pierced the snow of the second section, but were stopped by the planking. All the shots pierced the third and thinnest section. Shots fired from 1,200 and 1,300 yards only penetrated the snow for a depth of from 15 to 18 inches.

A GUNBOAT APPROPRIATELY NAMED.—There is in the English navy a gunboat named the *Frolic*, the ways of which are so frolicsome and free, and which is afflicted with such a constitutional "bias" toward the star-board tack that one set of engines is required to develop 100-horse power more than the other to keep her in a straight line. The eccentricity is inconvenient, but totally inexplicable. Her propellers are of the same type, the screws of the same pitch, and the blades in perfect accord. Ordered to the Cape, her commander found himself going direct for New York, and concluded to put into Portsmouth before he got any further on the way. Now, had it been the *Polypemus*, one could have understood it, but for a respectable boat, blessed with a pair of everything necessary to keep her in a straight path, to exhibit such a rakish preference for devious courses, suggests truly painful explanations.

AN INGENIOUS DESIGN FOR AN EXPLORING STEAMER.—A vessel of special and ingenious design is being prepared for Stanley's use in Africa. It will be propelled by a stern paddle-wheel, and the hull will be arranged in such a manner that it can be readily subdivided into a number of sections, each being floatable, and provided with fittings for receiving four large wheels. These wheels can be attached to each section while afloat, so that it can be drawn out of the water for transport overland without difficulty. Each of the subdivisions of the hull forms, when fitted with the wheels, a complete wagon in itself, capable of carrying the machinery of the steamer, merchandise, etc. It is to be completed the first of this year, and will be tested afloat under steam on the Thames.

A NOVEL SNOW PLOW ATTACHMENT.—There have been various methods resorted to for the purpose of cleaning the snow from railway tracks, such as using steam or hot water in connection with the snow plow. The latest departure, however, in this branch of railway engineering, appears to be the use of a combined snow plow and cannon, which is provided with a triple muzzle, so that when fired it will loosen the snow and allow of its removal by the plow. The mechanism of reloading and firing is under the control of the engineer, being operated entirely from the locomotive cab.

CAPT. EAD'S LATEST PROPOSITION.—Galveston is throwing up her hat in honor of Capt. Ead's answer to her committee's letter relating to her bar. The Captain says that if Congress will give him \$7,500,000 he will guarantee thirty feet of water, and maintain that depth for twenty years at a cost of less than \$100,000 a year. He proposes to give that city twenty-two feet of water within two years. A Texas newspaper says that with thirty feet of water on her bar Galveston will soon rank New York City.

THE CAPACITY OF PIPES is as the square of their diameters; if you double the diameter of a pipe you increase its capacity four times. A cubic foot of water weighs 62½ pounds, and contains 1,728 cubic inches, or 7½ gallons. Each nominal horse-power of boilers requires one cubic foot of water per hour. The ordinary speed to run a pump is 100 feet of piston per minute.

THE THAMES.—The Thames is about to have a second tunnel. The Severn resents the attempt at a tunnel by periodically flooding out and drowning the operators. The Mersey tunnel is rapidly becoming a fact, and the projectors of the Humber tunnel promise success.

USEFUL INFORMATION.

How to Boil Linseed Oil.

First be sure that you have the pure linseed oil. There is much sold as such manufactured out of peanuts. The test is simple. Nut oil has a sharp, acid taste, smells just like sour peanuts, is darker and thicker than the other oil, has a clinging tendency when rubbed on the finger, dries with a gloss even in priming coats, and is very much given to gumming up when sanded. Pure linseed oil has a bright amber color, runs freely, sparkles when flowing from the can, tastes smooth and mild, and has the smell of a flax seed poultice. When you are satisfied that you have the genuine oil, and wish to boil it thoroughly, first take, say about one-half pound of red lead and the same quantity of sugar of lead, put into five gallons of the oil, and place over a slow fire so as to boil evenly. Do not let your fire get either too hot or too low; keep an even temperature, if possible; coke or charcoal is preferable to either hard or soft stone coal. Avoid a wood fire, as, after the oil gets to boiling heat, a sudden flame shooting up might ignite the entire lot. Let it boil seven hours full; the red lead and sugar of lead will then become dark brown. Stir all the time while boiling slowly, and only one way; do not change the direction of the stroke or you will burn the oil, just as you would starch. After you have taken it from the fire, cover it up and let it stand to cool off, say over night. The sediment will settle; pour out the oil and strain; your oil is boiled, and a better article you could not have, as all the fatty substances are destroyed. This is the English method, used in all the carriage factories in the United Kingdom.—*U. S. Carriage Monthly*.

REMOVING SPOTS FROM GILT FRAMES.—Gilt frames are liable to become spotted and look bad, while it is, as a rule, difficult to remove the spots. Rubbing does not answer, for the stain sticks tighter than the gilding itself, and washing is liable to loosen the gilt, if put on with gum or dextrine.

The *Papier Zeitung* recommends the following method of renovating gilt frames: It consists in applying with a camel-hair pencil a gum solution, to which has been added gold bronze having the color of the frame. Before mixing with the gum water the bronze must be washed with water till it runs off perfectly clear. If one application does not suffice it may be repeated until the spot entirely disappears; but of course one coat must be dry before the next is applied.

Spots treated in this way look very well at first, but it will not last, for it is not able to resist the moisture in the air unless it is specially prepared. For this purpose an ordinary bristle brush is rubbed with a piece of yellow wax until it is somewhat sticky; then it is passed very lightly over the spot several times, as when dusting it. This gives it a very thin coating of wax that hardens in two or three days; in the meantime it must be protected against dust.

A NOVEL ELECTRIC GAS LIGHTER.—The covered street at Milan, now well known as the Victor Emmanuel Gallery, is roofed with glass and completed by a large dome, round the interior of which runs a chain of gas lamps. The lighting of these lamps at a considerable elevation used to present some difficulties, and was always a source of risk, until an arrangement was made for doing the work by electricity. A miniature railway has been constructed close to the gas burners, on which runs a little electric locomotive carrying a wick steeped in spirits of wine. When it is desired to light the burners, this wick is set on fire and the locomotive started on its career. It flies round, rapidly kindling the circle, and exciting great interest among the crowds that assemble nightly to witness the performance.

TO CURE sheep skins for home use, with or without the wool, and to prepare sheep skins and cattle hides for market: If the skins are green, lay the skin flesh up, and spread equal parts of salt, saltpeter and alum, pulverized finely; roll the skins closely and let them lie for a few days. Then wash thoroughly and scrape off any flesh that may remain on the skin. Then soak the skins for twenty-four hours in a weak solution of sal soda, borax and soap. Then wash in soap suds and soak again in a weak solution of alum and salt, equal parts. Then wash in warm water and dry. Then work the skin to soften by rolling and rubbing. The raw skins of sheep and cattle need only salting and drying for market.

TO STRAIGHTEN A BAND SAW.—A correspondent of the *Scientific American* says: Put the saw on to the machine and under tension, just as it is to be used. Use a steel straight edge ten or twelve inches in length to find the lumps or twists, which mark with chalk so as to know where to hammer. Now hold the oval face of a millwright's or carpenter's hard wood mallet opposite the chalk marks and against the saw, and with a light, oval-faced hand hammer knock out the lumps. Commence carefully, do not strike too hard. Examine your saw often with your straight edge to see how you get along, and you will soon be able to take out twists readily and get your saw perfectly true.

GREAT INDUSTRIAL RIVALS.—Germany is an important rival of the United States in some

respects. Germany's population is six millions less than that of the United States, and six millions more than that of France. Germany has 7,000,000 workmen, or about half as many as the United States, and 5,000,000 horse-power, much less in this respect than ours, but this difference may be partially offset by the former's system of cheap labor. France has about 1,000,000 horse-power, but this amount is subjected to the greatest degree of economy, as only the French people know how to economize in large things as well as in small things.

COURT PLASTER.—Soak isinglass in a little warm water for seventy-four hours; then evaporate nearly all the water by gentle heat; dissolve the residue in a little dilute alcohol, and strain the whole through a piece of open linen. The strained mass should be a stiff jelly when cold. Now stretch a piece of silk or sarcenet on a wooden frame, and fix it tight with tacks or pack thread. Melt the jelly and apply it to the silk thinly and evenly with a ladger-hair brush. A second coating must be applied when the first has dried. When both are dry apply over the whole surface two or three coatings of balsam of Peru. Plaster thus made is very pliable, and never breaks.

IMITATION WALNUT.—We have it on good authority, says an exchange, that an excellent stain for giving light colored wood the appearance of black walnut may be made and applied as follows: Take Brunswick black, thin down with turpentine until it is about the right tone and color, and then add about one-twentieth its bulk of varnish. This mixture, it is said, will dry hard and take varnish well.

IN HARDENING any article of steel that is thin or light and heats quickly, it is advisable to remove on a grindstone or emery wheel the scale formed in forging before heating. The scale being of unequal density, if it is not removed it is generally impossible to heat evenly; besides, the degree of heat can be better observed if it is removed.

TO WHITEN BRASS OR COPPER.—To whiten small articles made of brass or copper, boil them in three-quarters of a pound of cream tartar and one pound grain tin, or any pure tin finely divided. The tin dissolves in the cream of tartar and is precipitated on the brass or copper.

THE ORGAN INDUSTRY.—It is said that a single firm at Washington, N. J., has shipped 1,600 twenty-seven stop instruments during the month of November, 1883, against 980 for the same month of the previous year.

GOOD HEALTH.

Is Beer Healthful?

The belief that beer is a healthful drink is constantly urged upon us by manufacturers and lovers of this beverage, and physicians aid the spread of this delusion in many ways. It is not often that an unprejudiced person makes a careful study of the subject to see whether beer is really wholesome and life-giving or not, and so it is a pleasure to temperance advocates to hear from a man who has done so. That man is Colonel Green, President of the Connecticut Mutual Life Insurance Company. He says: "In one of our largest cities, containing a great population of beer drinkers, I had occasion to note the deaths among a large group of persons whose habits in their own eyes and in those of their friends and physicians were temperate; but they were habitual users of beer. When the observation began they were upon the average something under middle age, and they were, of course, selected lives. For two or three years there was nothing very remarkable to be noted among this group. Presently death began to strike it; and until it had dwindled to a fraction of its original proportions, the mortality in it was astounding in extent, and still more remarkable in the manifest identity of cause and mode. There was no mistaking it; the history was almost invariably: robust, apparent health, full muscles, a fair outside, increasing weight, florid faces; then a touch of cold, or a sniff of malaria, and instantly some acute disease with, almost invariably, typhoid symptoms, was in violent action, and 10 days or less ended it. It was as if the system had been kept fair outside while within it was eaten to a shell, and at the first touch of disease there was utter collapse; every fiber was poisoned and weak. And this, in its main features, varying, of course, in degree, has been my observation in beer drinking everywhere. It is peculiarly deceptive at first; it is thoroughly destructive at the last." This testimony is very strong, and we take pleasure in giving it to our readers, and we call special attention to the fact that a fair, ruddy outside is not always an indication of health, and also to the fact that, so far, the figures of the life insurance companies go to show that the teetotalers are likely to live longer than even the moderate drinker.

CHOOSE HEALTH OR SICKNESS.—Those who desire and appreciate health should be as willing to make some effort to secure it as they do to obtain the other good things which increase the pleasures of life. Pure water is essentially necessary to good health. All wells, cisterns and springs should be thoroughly cleaned in the early spring or in the autumn.

The usual method of placing a large stone on the top of the cistern is injurious to the water unless an aperture is left in the stone and fitted with a wooden cover. The air should not be wholly excluded from the cistern, else moldy conditions will predominate, although perhaps not apparent, and the water will not be wholesome, and in it sometimes there may be found various kinds of insects and reptiles. Water is the natural drink of all living creatures, and it serves several important purposes in the animal economy. Firstly, it repairs the loss of the aqueous part of the blood caused by evaporation and the action of the secreting and inhaling organs. Secondly, it is a solvent of various elementary substances, and therefore assists the stomach in digestion, though if taken in very large quantities it may have an opposite effect by diluting the gastric juice. Thirdly, it is a nutritive agent, that is, it assists in the formation of the solid parts of the body.—*London Lancet*.

DRINKING MILK. A correspondent of the *Herald of Health* asks: What is the best way to use milk when it seems best to increase the amount used? To which that paper answers: Persons who wish to introduce milk more largely into their diet to take the place of meat, will do well to make one entire meal of a day of milk, with oat-meal, wheaten grits, whole-lobbed wheat, rice, corn, or Graham mush, or bread. Although milk is as drinkable as water, it should be taken as food instead of drink, so as to receive the action of the salivary glands upon it, which forms a very important part in digestion. The value of milk as food cannot well be over-estimated, and the different ways in which it can be used are almost without number. Any one really desirous of making the most of it can quickly learn the number of delicious soups, puddings and vegetable dishes that can be prepared largely of it. Indeed, with milk, eggs, and fresh vegetables, which every farmer should have, not only in abundance, but variety, one can live most healthfully and deliciously. Those who use milk, however, should be sure it comes from healthy cows, and that it is not contaminated with bad water. We know a gentleman who takes for his breakfast every morning a fresh egg or two stirred into a glass of new milk, and he attributes to this, very largely, his remarkable health.

COLDS.—Young children are very subject to colds, for several reasons. First, their skins are unusually active and vascular, containing a much larger proportion of blood than those of adults; second, they are usually improperly clad, the middle portion of their body being so clothed as to induce perspiration, while the arms and legs are left nearly bare; third, they are rendered susceptible to cold air or drafts by being kept in too warm an atmosphere, and not exposed to out-of-door air. The habit of breathing through the mouth, which children are very apt to contract, may also be regarded as a frequent cause of taking cold, especially during the winter months. Children should be taught to inhale through the nose, the natural channel for inspired air, as by passing over the large mucous surface the air is warmed before entering the lungs, thus preventing congestion, which might give rise to serious inflammation of the air passages, or to pneumonia.

COCONUTS AS FOOD.—The coconut has a great sustaining power. A good instance of this is found in the case of a vessel which sailed some years ago from San Francisco for Sydney, New South Wales, with 400 passengers. The voyage was long and tedious, and there was a deficiency of provisions. Landing at an island a large quantity of coconuts was obtained, and for eighty days, in that water-logged ship, the men, women and children lived exclusively on them; and yet, during the voyage, not a life had been lost or a case of sickness occurred, but all were in excellent health. Another case is that of two men who drifted out to Quair's island in a whale boat, and remained there for seven years with no food but coconuts, and now and then a flying-fish which chanced to fall on the land, and yet when rescued they were in excellent condition, and had gained in weight.

WHICH IS THE BEST BEAN FOR FOOD.—*Herald of Health* answers this question as follows: The Lima bean is the best; but other kinds are also excellent, and it is just as well to use a variety of sorts. Another excellent bean is Carter's Leviathan Long Pod. The plant grows six feet high. Beans may be soaked in several ways, and ground to fine flour for soups. Bean soup is excellent, very nutritious and wholesome, and should appear on every table frequently.

RICE AND CORN.—Rice is rather more nourishing than corn in some respects and less in others. Rice has more albuminous and less mineral matter; corn more starch. It constitutes a chief article of food in India, where it costs about a cent a pound. As a food for children and invalids it ranks high, and is most easily digested, and does not cause indigestion. Its starch is almost all absorbed in the digestive tract, which is not the case with corn.

A NEGLECTED DISINFECTANT.—When the households of our grandmothers were threatened with infection the common practice was to sprinkle brimstone on a hot shovel, or on hot coals on a shovel, and carry the burning result through the house. But now this simple method of disinfecting has gone out of fashion without any good and sufficient reason.

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SAN FRANCISCO:

Saturday Morning, Jan. 26, 1884.

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Passing Events.

The end of the week has brought us the long
looked for and welcome rain which brings pros-
perity to all in California. With a good, steady
rain at this time a prosperous year is insured
for this State.

Note is made of the fact that some of the
hydraulic mining companies have discharged all
their ditch-tenders, and will let the ditches and
wasteways take care of themselves. The gates
of the dams have been opened, and the water
will be allowed to run to waste.

In the mining camps great interest is mani-
fested in all the news from the Cœur d'Alene
placers, in Idaho. There is no doubt but that
there will be a great rush for that region as
soon as the roads are opened.

Just now greater attention is being paid to
quartz mining in this State than for a long time
past.

The reports of rich placer diggings on Fish
creek, twenty miles from Butte, Montana, have
been confirmed. Gravel is ten feet deep, and
pays to the bed-rock.

Joe Bianchi and others will soon start up
the leaching works at Reveille district, Nevada,
on ores from the Gila mine. C. A. Ogden will
have charge of the works.

The Sutter Creek foundry is turning out a
large amount of work for the Pacific mine at
Plymouth, in order that the hoisting works
may be run by water and do away with wood.

Labor in Quicksilver Mining.

The quicksilver industry in this State cannot
be said to be in a flourishing condition. The
long prevailing depression in prices has had the
effect of closing down many producing mines,
and only the larger ones can now afford to work,
and they are not making much money for their
owners.

There are altogether about 1,200 men directly
employed in the quicksilver mines and furnaces
of California, in addition to whom a large num-
ber are occupied as wood-choppers, teamsters,
etc., working on contract. The leading national-
ities of the miners and furnace men may be
stated in the following order: Mexicans, Corn-
ishmen, Swedes and Chinese, with compara-
tively few Americans. The Mexican miners, as
in so many other instances, have developed a
special fitness for this class of work, and their
intelligence in finding ore amounts almost to an
instinct. For the regular underground work of
a mine, such as drilling, blasting, timbering,
etc., the Cornishmen and Americans probably
take the lead.

Miners at day work are paid from \$2 to \$3
per shift of 10 hours, and on contract work from
\$2.50 to \$3 per shift of 8 hours. The wages of
furnace men are \$2 to \$2.50 per shifts of 10 or
12 hours. The New Idria mine gives employ-
ment to about 120 men. There the wages of
white miners average \$2.25 cents per day, the
men hoarding themselves. Blacksmiths and
other mechanics and overseers are paid \$4 per
day. The Great Eastern mine employs 35 men,
half of whom are Chinese. At this mine white
miners are paid \$2.50 per day, hoarding them-
selves, and the Chinese, \$1.25. The Napa Con-
solidated employs from 60 to 70 men at about
the same wages. At the Sulphur Banks, when
at work, 90 men are employed, and the same
wages are paid as at the Great Eastern. In all
these mines mechanics and foreman are paid from
\$3.50 to \$4 per day. The Great Western gives
work to 25 men; white miners are paid \$1.25
per day and board; Mexicans \$2.50 and \$3
per day and board. At New Almaden, where a
force of 500 men is kept at work, the average
daily wages are \$2.50.

An estimate has recently been made from the
working results of different mines, showing that
for every flask of quicksilver produced nine
days' actual labor (calculated as if done by one
man) is required. This, at the low average of
\$2 per day, would make the amount paid for
labor \$18 for every flask manufactured, or be-
tween 23 and 24 cents a pound. This, at present
prices of quicksilver, does not allow much
margin for profit after accounting for the other
expenses, such as supplies, fuel, powder, flasks,
steel, transportation, etc.

Silver Mining in California.

After suffering a relapse and remaining under
a cloud for several years, this branch of mining
is again looking up in California, and the State
may even be expected to soon come to the front
as a producer of silver bullion. This view is
based on the large output of silver last year in
San Bernardino county, and the prospect that
the same will be materially increased the cur-
rent year. Without admitting the extravagant
claims advanced for these mines by the local
press off that way, there is no denying that
their record so far has been a good one, nor is
there much question but they will be able to
greatly augment their product hereafter. The
mineral territory is extensive, the metalliferous
veins are numerous, and the ore generally of
high grade. If now, the deposits prove perma-
nent, the future of these mines may be looked
upon as assured, the railroads that strike across
or near that country removing in part the great
impediment that heretofore checked the
development of its resources.

What railroads are doing for this eastern
section of San Bernardino, they are tending to
accomplish also for Alpine, Inyo and Mono
counties—our other leading silver producers—
where, also, mining for this metal has under-
gone much improvement of late. We hear of
some new smelters being erected in Inyo; also
of mills and reduction works doing an increased
business in that trans-Sierra tier of counties;
and, that there is greater activity in mining
over there than has prevailed for several years
past, seems evident.

SODA SPRINGS.—Williams, Bisbee & Co. are
arranging to start up the old copper smelter at
Soda Springs, in Esmeralda county, Nev.

Foundry Notes.

The Risdon Iron Works, which a short time
since completed the heavy hydraulic pumping
machinery for the Comstock, and which we de-
scribed at the time, has just shipped 15,000 feet
of 18-inch wrought-iron pipe to the Plymouth
mine, Amador county.

The Glohe Iron Works are quite busy on gen-
eral work, and are making a specialty of the
"Dyer Cannon Ball Quartz Mill," which we not
long since illustrated and described in the
PRESS. The machine is said to have proved
itself a cheap, effective and durable ore reduc-
ing appliance, and is no longer considered ex-
perimental. It has been thoroughly tested in
the mining regions, and the manufacturers say,
have met with unprecedented favor. A number
of mining superintendents who have been using
these mills testify to their efficiency.

The Union Iron Works are busily engaged on
their new and extensive plant near the Rolling
Mills, at the Potrero. The new works will have
as much capacity as all the foundries in the
city combined, and will be fitted with every
possible labor-saving appliance and convenience.
The various buildings are arranged in a manner
dictated by the long experience of the prop-
rietors, and are of a durable character. In the
matter of light and ventilation, things too often
partially neglected, these works will be notice-
able. The buildings have sides in which there
is a very large proportion of glass, so that the
interiors will be light and cheerful instead of
dark and gloomy, as is too often the case. The
new works will require a large outlay for their
completion, as they are of a very extensive char-
acter. New specialties are to be taken up,
among them iron shipwork, repairing, etc.
The works have a water frontage, and the de-
sign contemplates a wharf and dry dock. San
Francisco is one of the most extensive shipping
ports of the world, and the business is expected
to extend. The expense of docking and repair
has been a great drawback heretofore, but the
combination of iron works and dry dock is a new
feature, which should remove the objectionable
points. The enterprise of the gentlemen con-
nected with the company is greatly to be com-
mended. Doubtless it is one of the results of
Mr. Irving M. Scott's tour around the world,
for on his return he must have been even more
than ever impressed with the importance of this
city as a center for the manufacturing interest,
and have seen into the future far enough to feel
assured of its ultimate needs.

Lime.

Lime for mortar and other building purposes
is burnt to a greater or less extent in every
State in the Union. The production is esti-
mated to be about 31,000,000 barrels of 200
pounds each, worth 65 to 75 cents per barrel,
spot value. The total valuation of the product
is some \$21,700,000. The lime product presup-
poses the quarrying of about 6,000,000 tons of
limestone. In the Rocky mountain region lime-
stone occurs everywhere in great quantity and
purity, and kilns are erected where local de-
mands warrant it.

Common limestone, though an abundant rock
on this coast, occurs sparingly in Oregon, and
perhaps also in Washington Territory. The re-
ceipts of lime at San Francisco for the ten years
ending with Jan. 1, 1884, were as follows, the
whole being the product of California:

Years.	Barrels.
1874.....	145,213
1875.....	132,631
1876.....	174,758
1877.....	155,113
1878.....	144,072
1879.....	104,405
1880.....	133,097
1881.....	123,779
1882.....	133,306
1883.....	155,053

This year our production was greater than for
some time past. During the past ten years the
prices of lime in San Francisco have varied from
\$1.50 to \$1.75 per barrel, the present price being
from \$1.25 to \$1.50 per barrel. The price de-
pends somewhat on the quantity purchased, but
generally it has varied little during the year.
The lime business here is all in the hands of the
two firms, Davis & Cowell and Blochman & Cerf.
While lime is burned at various parts of the
State, about one-third of the California product
is made in Santa Cruz county, where a highly
crystalline limestone occurs in great abundance.

A PASSENGER and transportation company, to
run freight lines and stages between Spokane
Falls, W. T., and Cœur d'Alene, I. T., was
formed at Spokane Falls Saturday.

New Hydraulic Quick-Boring System.

The systems of deep earth boring by means
of the diamond crown offers many advantages,
but it has also some serious defects. Chief
among these is its unsuitability for soft, and es-
pecially gravelly strata. A thin bed of such a
character will seriously retard the progress of a
boring; in some instances it has been found to
be impossible with the diamond borer. The
substitution of the ordinary falling tools in such
cases takes up so much time and is so liable to
injure the bore-hole that the evil can hardly be
said to be obviated by this means. An inven-
tion of Olaf Terp for removing this defect from
the system has recently been tested in Austria,
and is now working very effectively at the col-
lieries of John D. Stark, at Prague. It con-
sists of a steel borer of a peculiar construction,
which is made to replace the diamond crown
when a soft stratum is encountered. Hydraulic
pressure is used in conjunction with this boring
tool to force up to surface as sludge the material
cut away at the bottom of the hole. This con-
stitutes the principal feature in Terp's system,
and hence the latter has been named "the hy-
draulic quick-boring system." It will be per-
ceived that the removal of the sludge by this
means not only keeps the drill edge clear, but
saves the great loss of time which would other-
wise be incurred in the frequent raising and
lowering of the tools. When the soft stratum
has been pierced and solid rock again reached
the diamond crown resumes the place of the
steel borer, and cores several inches in diameter,
and from fifteen to twenty feet in length, are
brought up. The speed with which the difficult
strata are passed through by this system justifies
its appellation of "quick-boring," and the
highly satisfactory results already attained have
attracted the attention of the well borers in the
petroleum districts, who are preparing to adopt
it. For prospecting purposes it is so admirably
suitable that its application is likely to be
widely extended.

California Mines.

California is not by any means going to drop
out of sight as a mining country; and even its
production of precious metals is not going to be
so very materially decreased as some persons
appear to imagine. Of course the cessation of
work on the hydraulic mines will have a serious
effect in more ways than one; but the stoppage
of those mines does not stop all the mining.
The drift owners will continue work, and some
parts of some of the hydraulic mines will be
drifted. And river-bed mining and silver min-
ing will both add up something to our bullion
product. Already a tendency is manifesting
itself, as the PRESS predicted, to an increased
attention in quartz mining. Men who can no
longer work in the hydraulic mines will hunt
up quartz mines and work them, either taking
up old claims or prospecting for new ones. In
fact there seems to have arisen as one of the re-
sults of the hydraulic mining litigation a sort
of quartz boom in several of our counties.
Greater interest is now taken in quartz mining
than for some time past; and there is reason to
believe this will spread. As evinced by our
very complete mining review published last
week, the PRESS has every confidence that Cal-
ifornia will continue to be a leading mining
State. So firmly established a business as min-
ing is among us is not likely to be entirely done
away with simply because a branch of it meets
with unfortunate reverses.

RUBY DUNDERBERG.—The day's-pay men
who were discharged from the Homo Ticket
mine, belonging to the Ruby-Dunderberg Min-
ing Company, were offered a chance to resume
their places and work for a percentage of the
net profit of all the ore extracted from the
mine. The terms did not suit the miners, so
they refused to work, and are still out.—*Eureka
Sentinel.*

A MILL is being built near the mouth of Cot-
tonwood, at the southern end of Fish Lake
valley. O. K. Berry and a number of other
miners in that district have mines which will
yield gold ore enough to keep the mill profitably
employed for years. So says the *Virginia En-
terprise.*

THE Nevada *Herald* learns that the Sailor
Flat mine, at Blue Tent, which is one of the
enjoined mines under the Sawyer decision, will
not attempt to drift, as has been stated, as it
would be impracticable, as the gold is found
widely scattered, and in very fine particles.

The Secretary read the following list of appointments by the Council for the year:

Publication Committee, George Davidson, Chas. G. Yale and Dr. H. H. Behr. Curators—Birds and mammals, E. F. Loring; radiates, reptiles and crustacea, J. J. Rivers; fishes, Miss Rosa Smith; ethnology and osteology, A. B. Stout; botany, E. L. Green and Mrs. Mary K. Curran; entomology, H. H. Behr; conchology, Josiah Keep; mineralogy, J. T. Evans and W. M. Wolfe; geology and paleontology, Melville Attwood.

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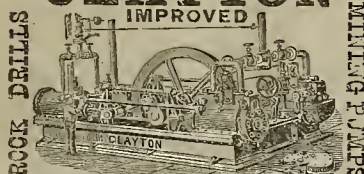
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Ingersoll, D2 3", beat Rand 3 1/2".....	.741 " "
Ingersoll, D2 3", beat National 3 1/2".....	.505 " "
Ingersoll, E 3 1/2", beat Rand 3 1/2".....	.560 " "
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National beat Rand.....	.139 " "

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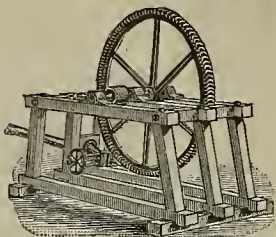
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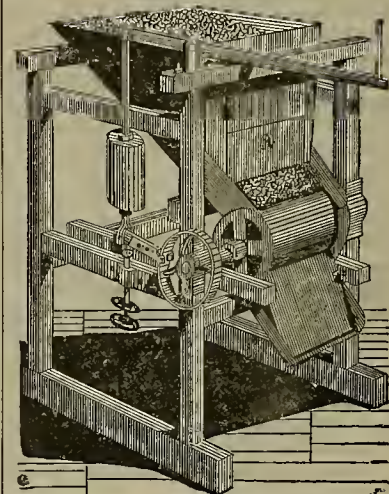
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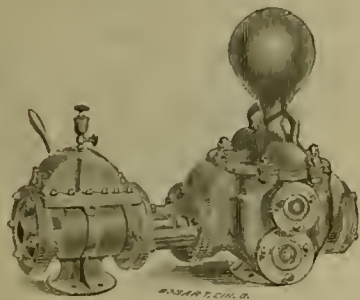
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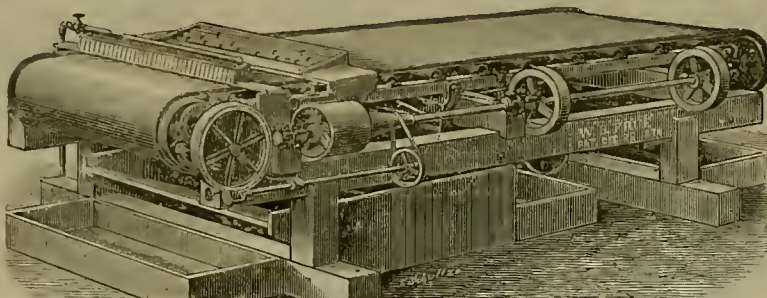
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List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.]

FOR WEEK ENDING JANUARY 8, 1884.

- 291,567.—CAN OPENER—H. Benthall, S. F.
291,489.—PAPER BAG HOLDER—Albert Brown, Mendocino, Cal.
291,691.—SINGLE CABLE TRACK RAILWAY—J. J. Clisham, San Diego, Cal.
291,583.—MACHINE FOR HOOPING BARRELS—Duff & Allen, S. F.
291,585.—DIRT SCRAPER—Chas. Endicott, Kingsburg, Cal.
291,595.—WATER COOLER—W. A. Hawthorn, Hawthorn, Nev.
291,733.—ROAD CAR—H. Hortop, Rutherford, Cal.
291,526.—SECONDARY BATTERY—Molera & Cebrian, S. F.
291,627.—COMBINATION TOOL—John Ryan, Salt Lake City, U. T.
291,597.—WASHING SOAP—R. H. Withington, Sacramento, Cal.
291,836.—WINDOW SCREEN—Geo. W. Boynton West Oakland, Cal.

FOR WEEK ENDING JANUARY 15, 1884.

- 291,982.—BUTTON CARD—H. A. Buttner, San Quentin, Cal.
292,097.—SAW TOOTH SWAGE—S. J. Chalfant, Albion, Cal.
292,105.—LIFTING PUMP—Curtis & Caine, Logan City, U. T.
291,994.—FARM GATE—C. J. Doane, Gilroy, Cal.
291,597.—CONCENTRATOR AND AMALGAMATOR—Geo. N. Evans, S. F.
291,894.—JET WATER WHEEL—A. J. Gould, Quincy, Cal.
291,898.—CABLE RAILWAY PROPULSION—W. W. Hanscom, S. F.
291,921.—CARD FRAME—A. W. McArthur, Arroyo Grande, Cal.
292,025.—TRANSMITTING POWER—McCall & De Vry, S. F.
292,031.—CENTER BOARD—Mills & Gordon San Rafael, Cal.
292,034.—SECONDARY BATTERY—Molera & Cebrian, S. F.
292,036.—SAND BAND FOR WHEELS—M. Raphael, Wadsworth, Nev.
291,947.—IRRIGATING APPARATUS—C. M. Skillen, Pasadena, Cal.
291,956.—FASTENING FOR TOOL HANDLES—T. A. Sweet, Cambria, Cal.
292,080.—CANNING APPARATUS—R. Wheeler, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press American and Foreign Patent Agency, the following are worthy of special mention:

ADJUSTABLE CENTER-BOARD FOR VESSELS.—George L. Mills and U. M. Gordon, San Rafael, Marin Co. No. 292,031. Dated Jan. 15, 1884. This center-board has a peculiar adjustability adapting it to maintain its perpendicularity. The center-board is hinged along its top longitudinally, and pivoted at one end; and means are provided for turning it laterally on its hinge. The object is to keep the board perpendicular, no matter what may be the list or heel of the boat, in order to prevent her falling off to leeward from lateral pressure of the wind. The operation of the device is as follows: When the boat has a list and a consequent tendency to "fall off" or slide to leeward, the center-board being lowered, would, in ordinary cases, have an inclination with the boat. In this case, however, by the movement of a wheel and suitable mechanism, the center-board is slanted at a suitable angle to be at right angles with the surface of the water, and may be kept in that position. As the vessel comes on the other tack, the inclination of the board may be reversed. Any desired angle may be maintained in accordance with the amount of list the vessel takes.

TRANSMITTING POWER FROM CENTRAL STATIONS.—Wm. McCall and J. V. De Vry, S. F. No. 292,025. Dated Jan. 15, 1884. This invention relates to a means for transmitting power from a central or distant source, and it consists of a flat traveling endless cable, having openings or eyes formed in it at regular distances apart. This cable is driven by fixed machinery at some point, and travels over pulleys which lead it to the point where the power is desired. Shafts extend from the buildings where the power is to be used, and have toothed wheels fixed to their outer ends, the teeth engaging in slots or openings in the cable, so as to be driven by it. The invention is applicable where street cable railways are laid, and the power being taken directly from the endless traveling cable which propels the cars; or the cable may be laid especially for the sole purpose of transmitting power.

CANNING APPARATUS.—Richard Wheeler, S. F. No. 292,080. Dated Jan. 15, 1884. This invention comprises an apparatus for putting up hermetically sealed goods of all descriptions, in which a reservoir and heater are employed with a series of separate inclosed chambers to contain the cans or jars and a means of supplying steam or hot air. The present invention consists in certain improvements in the chambers for retaining the jars or cans in a central position,

in a shield or means for protecting the operator from the escaping steam when the door of the apparatus is opened, and in an exterior double walled case having openings in valves, through which hot air may be admitted around the inner chambers, so as to partially superheat the steam.

SUPPORT FOR BEAMS AND GIRDERS.—Peter H. Jackson, S. F. No. 291,192. Dated Jan. 1, 1884. This invention relates to an improved connection and support between girders and beams which meet them at right angles and at points intermediate between their ends. It consists of independent wrought-iron plates which extend across the girder or girders, and also over the end of the beam, above and below, and a wrought-iron clamp or band which surrounds the end of the beam and the plates, together with bolts, wedges and check pieces. Mr. Jackson has made a specialty of the construction of beams, girders, etc., and has made several inventions in this line. As they are rapidly introduced into use they must be of a practical character, adoption being probably the best proof of this.

KEY-FASTENER.—E. W. Wagner, Cherokee, Butte Co. No. 291,434. Dated Jan. 1, 1884. The object of this key-fastener is to receive the key within the lock, in order to prevent it from being turned from the outside by those means in use by those who seek unlawful entrance. The invention consists of a sliding bolt seated within the lock-casing and operated by means of a thumb-piece projecting through a slot in said casing, said bolt being adapted to engage with a notch in the bit of the key.

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Mining Share Market.

The main interest has been in Bodie during the week. The Bodie Free Press says in relation to the matter, that "the new management has but little to say about the development, but the miners who quit when the change took place last Monday, can talk of nothing else. The town, in fact, has been in a fever of excitement over the strike for two weeks past, and everybody here believes the mine to be more valuable than it ever was before. The fact is recalled that on the strike of the first Bodie bonanza in 1878, the stock went to \$56 per share, and on the second in 1879 to \$45, they now look for something similar or even greater. There are between 23,000 and 24,000 shares of the company's stock in the treasury of the company in San Francisco, taken in from the last assessment; so the mine is now represented by between 76,000 and 77,000 shares only.

Up on the Comstock all work at the north end is progressing very satisfactorily, and they will now shortly have things in shape for doing some very interesting prospecting work at that end of the lode.

At the Gould and Curry, the old Bonner shaft has been put in good repair down to the 1,200 level. They will now clean out and repair the main north drift on that level up to the Consolidated Virginia line, when J. P. Jones will take the drift, and put his men into it. They will then advance into the ground in the California and Consolidated Virginia which is covered by the Jones contract, and will at once begin taking out and shipping ore.

At Gold Hill all operations are still on a small scale because of the low stage of water in the Carson river. Also, there has been some trouble on account of the wheels of the mills freezing up of nights. At the Alta they are now about ready to resume work in the face of the east drift, when they will push out to the ore body tapped by the diamond drill.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

A MACHINE to make bobnails with a capacity of one ton per day, has been invented at Pittsburg, where a factory will shortly be established. Three men can thus do the work formerly requiring one hundred.

DURING the year past \$631,166.77 in gold coin, dust and bullion have been shipped from the town of Pendleton, Or.

A TRAMP was recently found frozen to death on top of a sleeping car near Caliente.

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Antman M & M Co.	California.	1.	2.	Dec 22.	Jan 29.	Feb 18.	J. M. Buffington.	309 California st	
Acme M Co.	California.	7.	8.	Dec 22.	Jan 29.	Feb 18.	J. M. Buffington.	309 California st	
Baker Divic M Co.	California.	8.	20.	Dec 5.	Jan 29.	Feb 18.	W. G. Hughes.	330 Pine st	
Bodie Con M Co.	California.	4.	50.	Dec 21.	Jan 30.	Feb 29.	G. W. Sessions.	309 Montgomery st	
Belle Isle M Co.	Nevada.	6.	15.	Jan 3.	Feb 11.	Mar 7.	J. W. Pew.	310 Pine st	
California M Co.	Nevada.	10.	20.	Jan 4.	Feb 11.	Mar 8.	C. P. Gordon.	309 Montgomery st	
Copporopolis M Co.	Arizona.	1.	5.	Jan 2.	Feb 6.	Mar 25.	J. H. Sayre.	330 Pine st	
Caborena M Co.	Mexico.	8.	10.	Jan 9.	Feb 15.	Mar 17.	W. J. Taylor.	220 Sansome st	
Day S M Co.	Nevada.	14.	30.	Dec 1.	Jan 7.	Feb 5.	E. M. Hall.	327 Pine st	
Elkton Quicksilver M Co.	California.	2.	10.	Dec 7.	Jan 15.	Feb 4.	F. A. Berlin.	420 Montgomery st	
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Eureka Con M Co.	Nevada.	7.	1.00.	Jan 15.	Feb 15.	Mar 10.	E. H. Wilson.	783 Folsom st	
Golden Pledge M Co.	California.	31.	—.	Dec 12.	Jan 18.	Feb 17.	F. Schirmer.	309 California st	
Goodshew M Co.	California.	15.	10.	Jan 13.	Feb 12.	Mar 3.	C. C. Harvey.	309 California st	
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Holmes M Co.	Nevada.	8.	1.00.	Dec 26.	Jan 29.	Feb 19.	C. T. Bridge.	224 California st	
Independence M Co.	Nevada.	12.	20.	Dec 1.	Jan 4.	Feb 28.	J. W. Pew.	310 Pine st	
Jupiter Deep Blue Gravel M Co.	Cal.	1.	1.00.	Dec 17.	Feb 16.	Apr 4.	G. Laude.	426 California st	
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Hayflower Gravel M Co.	Nevada.	22.	10.	Jan 5.	Feb 5.	Feb 27.	J. Morizo.	328 Montgomery st	
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Mammoth Bar M Co.	California.	4.	15.	Jan 14.	Feb 18.	Mar 10.	J. W. Pew.	310 Pine st	
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Marble White M Co.	Nevada.	17.	25.	Dec 24.	Feb 7.	Mar 7.	J. J. Souville.	309 Montgomery st	
Menstrual M Co.	California.	17.	10.	Jan 10.	Feb 23.	Mar 12.	R. Wegener.	414 California st	
New Coso M Co.	California.	17.	40.	Jan 18.	Feb 26.	Mar 31.	E. B. Clement.	710 Washington st	
Northern Belle M Co.	Nevada.	1.	50.	Nov 30.	Jan 1.	Jan 28.	W. Willis.	309 Montgomery st	
North Belle Isle M Co.	Nevada.	7.	10.	Jan 3.	Feb 8.	Feb 23.	J. W. Pew.	310 Pine st	
Original Keystone M Co.	Nevada.	7.	10.	Jan 21.	Jan 30.	Feb 23.	C. T. Bridge.	309 Montgomery st	
Final Con M Co.	California.	17.	5.	Dec 15.	Jan 23.	Feb 15.	A. Adler.	309 Montgomery st	
Pittsburg M Co.	California.	17.	20.	Jan 5.	Feb 8.	Feb 29.	R. Wegener.	414 California st	
Rainbow M Co.	California.	9.	20.	Jan 3.	Feb 5.	Mar 6.	J. S. Jordan.	311 Montgomery st	
Sierra Nevada S M Co.	Nevada.	78.	1.00.	Jan 15.	Feb 20.	Mar 17.	E. L. Parker.	309 Montgomery st	
San Miguel & Remida M Co.	Mexico.	4.	10.	Feb 13.	Mar 10.	Apr 6.	C. Brooks.	270 Front st	
Santa Anita M Co.	California.	6.	1.	Dec 22.	Jan 29.	Feb 15.	J. M. Cunningham.	309 California st	
Tobongo M Co.	California.	1.	30.	Dec 18.	Jan 23.	Feb 17.	J. L. Fields.	330 Pine st	
Union Gravel M Co.	California.	18.	50.	Jan 18.	Feb 26.	Mar 18.	H. Pichot.	379 Sansome st	
Utah S M Co.	Nevada.	47.	1.	Jan 4.	Feb 11.	Mar 3.	C. T. Bridge.	270 Front st	
Union Con M Co.	California.	17.	50.	Jan 4.	Feb 7.	Feb 27.	J. M. Cunningham.	309 California st	
Wide Awake M Co.	Arizona.	17.	20.	Nov 17.	Dec 28.	Jan 23.	C. Hildebrandt.	320 Sansome st	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DAT.
Con Amador M Co.	California.	F. B. Latham.	408 California st.	Annual.	Feb 4
Holmes M Co.	California.	C. T. Bridge.	234 California st.	Annual.	Feb 12
Milton M Co.	California.	H. Pichot.	320 Sansome st.	Annual.	Feb 8
North Bloomfield M Co.	California.	H. Pichot.	320 Sansome st.	Annual.	Feb 7
Sulphur Banks (Quicksilver) M Co.	California.	H. Pichot.	320 Sansome st.	Annual.	Feb 7
Wide Awake M Co.	California.	C. H. Hildebrandt.	320 Sansome st.	Annual.	Feb 13

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Jan 15
Best & Belcher M Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Jan 15
Constitution Con M Co.	Arizona.	D. C. Bates.	309 Montgomery st.	25.	Jan 12
Derbec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery st.	10.	Jan 4
Idaho M Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Dec 2
Jackson M Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Jan 4
Keenock M Co.	Nevada.	J. W. Pew.	310 Pine st.	10.	Jan 4
Mt Diablo M Co.	Nevada.	R. W. Heath.	318 Pine st.	25.	Nov 26
Standard Con M Co.	California.	Wm. Willis.	309 Montgomery st.	25.	Jan 12
Silver King M Co.	Arizona.	J. Nash.	315 California st.	25.	Dec 15

Sales at San Francisco Stock Exchange

THURSDAY A. M. Jan. 24.	AFTERNOON SESSION.
189 Alta.....1.55	350 Alta.....1.65
50 Alpha.....1.00	80 Alpha.....1.00
5500 Argenta.....0.50	100 Best & B.....2.70
1895 Bodie Con.....8.85	1555 Bodie.....7.75
55 Bodie King.....1.10	40 Bodie King.....1.10
50 Bodie Tm.....1.10	40 Bulwer.....2.00
370 Bulwer.....2.10	70 Bonza King.....1.10
30 Belcher.....1.00	50 Belle Isle.....1.50
50 B. & Belcher.....2.75	100 Con. Virginia.....3.00
50 Bullion.....7.00	200 Chollar.....2.05
200 Chollar.....2.05	120 Chollar.....2.05
100 Con. Virginia.....2.50	400 California.....0.50
350 Champion.....7.50	50 Eureka Con.....2.10
330 California.....0.50	155 Gould & Curry.....1.45
240 Con. Virginia.....2.00	300 Hule & Nor.....6.00
1400 Day.....3.00	200 Independence.....0.50
500 Deane.....3.50	50 Mexican.....1.95
103 Eureka Con.....2.20	1930 Mono.....1.45
450 Gould & Curry.....1.30	100 Hule & Nor.....2.00
325 Hale & Nor.....1.50	540 Navajo.....4.00
310 Mexican.....1.70	50 Northern Belle.....4.50
1195 Mono.....1.45	200 Potomac.....7.00
210 Ophir.....3.35	210 Sierra Nevada.....2.70
400 Potomac.....7.00	300 Hule & Nor.....2.00
730 Sierra Nevada.....2.70	100 Silver Hill.....1.00
600 Savage.....8.50	550 Summit.....2.50
300 Scorpion.....3.50	50 Tioga.....2.50
200 Solid Silver.....1.50	400 Union.....2.45
50 Summit.....2.50	90 Yellow Jacket.....2.10
100 Utah.....1.20	

San Francisco Metal Market.

WROUGHTS.	THURSDAY, Jan. 24, 1884.
ANTIMONY—Per pound.....	14 @ 5
IRON—American Pig, soft, ton.....	30 @ 6 1/2
Scotch Pig, ton.....	24 @ 28 50
American White Pig, ton.....	23 @ 32 50
Oregon Pig, ton.....	32 @ 35 50
C. Upper Gap, Nos. 1 to 4.....	32 @ 35 50
Upper Bar.....	50 @ 31
Horseshoe.....	5 @ 30
Nail Rod.....	7 @ 30
Norway, according to thickness.....	6 @ 7
STEEL—English Cast, lb.....	14 @ 15
Black Diamond, ordinary sizes.....	14 @ 15
Drill.....	15 @ 16
Machinery.....	12 @ 14
COPPER—Ingot.....	22 @ 26
Braziers' sheets.....	31 @ 32
Fire-shoots.....	31 @ 32
Nails.....	17 @ 18
Bolt.....	31 @ 32
Old.....	8 @ 10
Bar.....	12 @ 13
Cement, 100 fine.....	4 @ 4
LEAD—Pig.....	51 @ 6
Bar.....	7 @ 8
Pipe.....	8 @ 9
Sheet.....	8 @ 9
Sheet, discount 10, on 500 bags: Drop, F bag.....	2 @ 10
Sheet, 20 bag.....	2 @ 10
Chilled, do.....	2 @ 10
TIN PLATES—Charcoal.....	6 @ 6 50
Coke.....	5 @ 5 75
Brucia Tin.....	21 @ 20
Australia.....	6 @ 6 80
I. C. Charcoal Roofing, 14x20.....	19 @ 19
ZINC—By the cask.....	3 @ 4 75
Sheet, 7x3 1/2, to 10 lb, less the cask.....	3 @ 4 75
Nails.....	3 @ 4 75
QUICKSILVER—By the flask.....	1 @ 24
Flasks, new.....	1 @ 24
Flasks, old.....	85 @ 85

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 2.	WEEK ENDING Jan. 9.	WEEK ENDING Jan. 16.	WEEK ENDING Jan. 23.
Alpha.....	1.15	1.35	1.20	1.40
Alta.....	1.05	1.30	1.65	1.85
Andes.....	.....	.50	.40	.50
Alhion.....	.....	.05	.....	.05
Argentina.....	.....	.05	.....	.05
Atlas.....	.....	.....	1.00	.20
Balding.....	1.00	.....	1.00	1.25
Best & Belcher.....	2.60	3.00	2.60	2.90
Bullion.....	.....	.60	.70	.90
Bodet.....	.....	.....	.....	.20
Bodie.....	.....	1.40	.15	.....
Bodie Con.....	.85	1.55	1.45	1.30
Benton.....	.....	.35	.30	.40
Bodie Tunnel.....	.....	.....	.....	.60
Baldonia.....	.....	.....	.....	.05
California.....	.....	.10	.10	.....
Challenge.....	.....	.25	.....	.25
Chollar.....	2.50	2.75	2.40	2.60
Confidence.....	.....	1.00	1.10	1.50
Con. Imperial.....	.....	.....	.....	.05
Con. Virginia.....	.....	.30	.25	.30
Crown Point.....	.....	.90	.95	1.10
Day.....	.....	.....	.50	.65
Elko Con.....	.....	.20	.20	.....
Eureka Con.....	.....	2.25	2.00	2.25
Eureka Tunnel.....	.....	.45	.50	1.40
Exchequer.....	.....	.35	.30	.40
Grand Prize.....	.....	.20	.15	.20
Gould & Curry.....	1.70	2.05	1.95	2.20
Hale & Norcross.....	2.10	2.10	2.15	2.10
Holmes.....	.....	.50	.50	.....
Independence.....	.....	.....	.....	.30
Julia.....	.....	.05	.....	.10
Justice.....	.....	.30	.25	.30
Jackson.....	.....	.....	.....	.....
Kenner.....	.....	.....	.....	.....
Martin White.....	.....	.25	.....	.....
Mono.....	1.15	1.25	.80	1.00
Monterey.....	.....	2.15	.95	2.00
Mt. Diablo.....	1.50	2.00	2.00	2.00
Mt. Potosi.....	.....	.....	.....	.....
Noonday.....	.....	.60	.....	.50
Northern Belle.....	.....	.65	.50	.....
North Belle.....	.....	.35	.40	.....
Nevado.....	2.50	3.35	2.40	2.50
North Belle Isle.....	.....	.20	.35	.25
Occidental.....	.....	.30	.....	.....
Opah.....	3.45	4.05	3.70	3.80
Oro.....	.....	1.50	.30	1.50
Potosi.....	1.10	1.25	1.50	1.65
Pinal Con.....	1.05	1.15	.95	1.10
Salvador.....	.....	.....	.....	.....
Sierra Nevada.....	2.85	3.25	2.60	3.05
Silver Hill.....	.....	.....	.10	.15
Silver King.....	.....	8.00	7.50	6.75
Sales.....	.....	.35	.40	.35
Tuscarora.....	.....	.....	.....	.....
Union Con.....	2.65	2.80	2.50	2.60
Uta.....	1.35	1.50	1.10	1.35
Ward.....
Yellow Jacket.....	1.90	2.50	2.10	2.35

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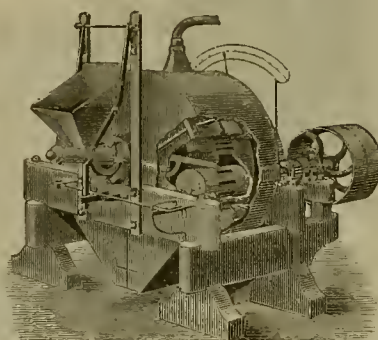
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The German Savings and Loan Society.

For the half year ending December 31, 1883, the Board of Directors of the German Savings and Loan Society has declared a dividend on Term Deposits at the rate of four and thirty-two one hundredths (4 32/100) per cent, per annum, and on Ordinary Deposits at the rate of three and six tenths (3 6/10) per cent, per annum, payable on and after the 2nd day of January, 1884. By order,
GEO. LETTE, Secretary.

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DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company.

San Francisco, January 16, 1884.

At a meeting of the Board of Directors of the above named company, held on the 15th inst., Dividend No. 10, of ten cents (10c.) per share, was declared, payable on Thursday, January 31, 1884. Transfer books closed on Wednesday, January 23, 1884, at 3 o'clock p. m. This dividend is payable at the office in this city on all stock issued here and at the Farmers' Loan and Trust Company in New York on all stock issued there. WM. WILLIS, Sec'y.

OFFICE—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, January 2, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 63, of twenty-five cents (25c.) per share, was declared, payable on SATURDAY, January 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.
OFFICE—Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

Annual Meeting—Office of the Albion Consolidated Mining Company.

309 Montgomery St., San Francisco, Jan. 14, 1884.
The Regular Annual Meeting of the Stockholders of the Albion Consolidated Mining Company will be held at the office of the Company, room 26, Nevada Block, 309 Montgomery St., San Francisco, Cal., on WEDNESDAY, the 30th day of January, 1884, at the hour of one o'clock, p. m., for the election of a Board of Directors to serve for the ensuing year, and the transaction of such other business as may properly come before the meeting. Transfer books will close on Monday, Jan. 28, 1884, at 3 o'clock p. m.
A. W. HAYENS, Secretary.

This paper is printed with Ink Manufactured by Charles Enou Johnson & Co., 509 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

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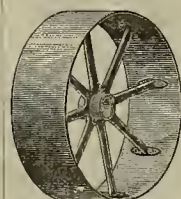
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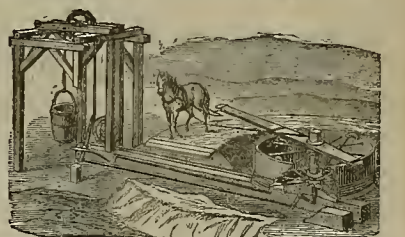
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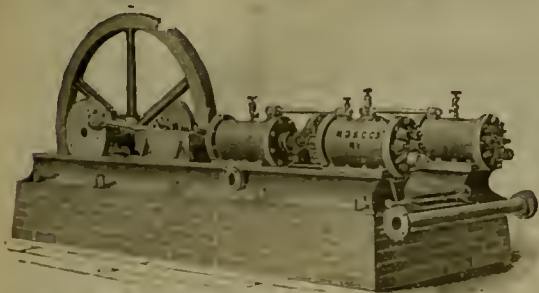
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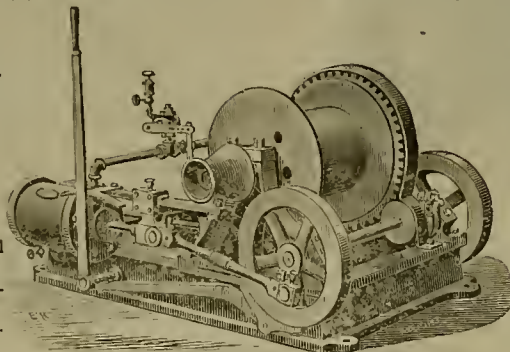
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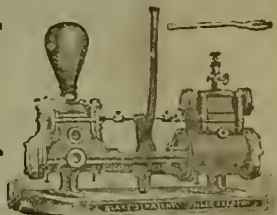
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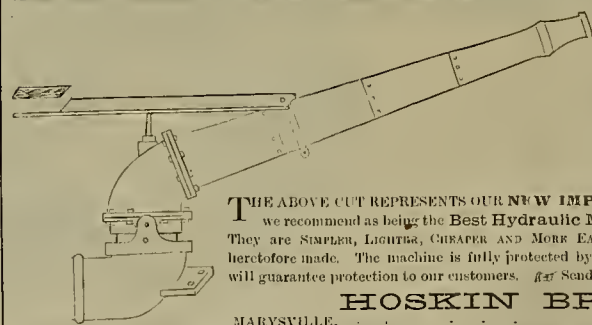
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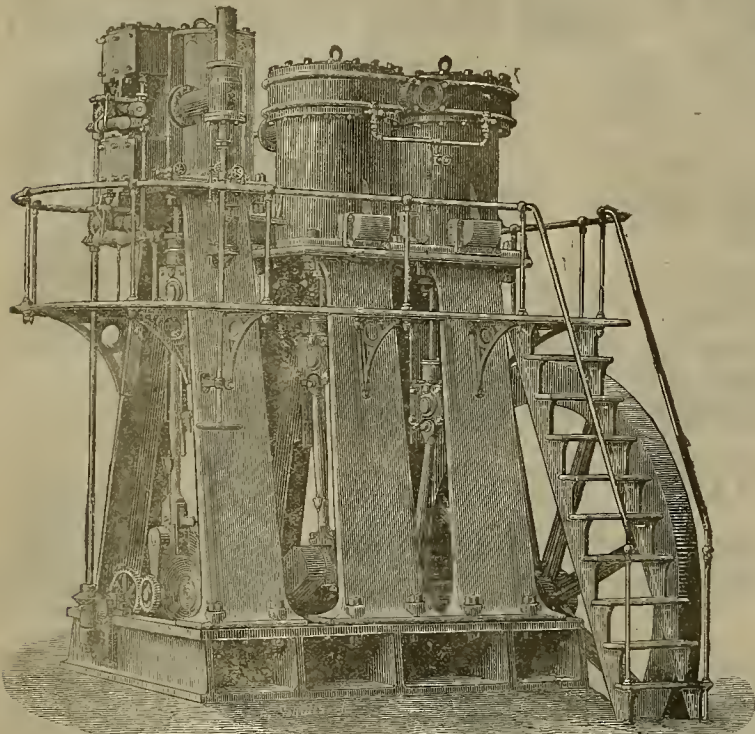
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Zelle.....	40	".....	" " " "
Pacific.....	40	".....	" " " "
Nashville.....	20	".....	El Dorado " "
Gross.....	80	".....	" " " "
Julian.....	20	".....	Placer " "
St. Patrick.....	15	".....	" " " "
Providence.....	40	".....	Nevada " "
Emery.....	20	".....	" " " "
Idaho.....	30	".....	" " " "
Green Mountain.....	60	".....	Plumas " "
Plumas-Eureka.....	60	".....	" " " "
Bulwer-Standard.....	30	".....	Bodie, Mono, " "
Standard.....	20	".....	" " " "
Noorda.....	30	".....	" " " "
Big Dry Creek.....	10	".....	Fresno " "
Mexican.....	44	".....	Lyon county, Nevada " "
Santiago.....	32	".....	" " " "
Vivian.....	14	".....	" " " "
Christy.....	5	".....	Utah, county, Utah " "
Contention.....	5	".....	Tombstone, Ariz na " "
Grand Central.....	96	".....	" " " "
Sunshine.....	20	".....	Black Hills, Dakota " "
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The publishers of the Capital City Home Guest, the well-known illustrated Literary and Family Magazine, make the following liberal offer for the New Year: The person telling us the longest verse in the Bible, before March 1st, will receive a Solid Gold, Lady's Hunting Cased Swiss Watch, worth \$50; If there be more than one correct answer, the second will receive an elegant Stem-winding Gentleman's Watch, the third, a key-winding English Watch. Each person must send 25 cts. with their answer, for which they will receive three months' subscription to the Home Guest, a 50-page illustrated New Year Book, a case of 25 articles that the ladies will appreciate, and paper containing names of winners. Address, Pubs. of HOME GUEST, HARTFORD, CONN.



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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 2, 1884.

VOLUME XLVIII
Number 5.

Pacific Coast Clays.

Elsewhere we mention among the mineral products of California the various clays. While most of the discoveries of fire and fire-potters' clays so frequently announced have proved disappointment, the deposits, many of them being infusorial or other worthless earths, material suitable for fire-brick and earthenware really exists in many places on this coast, the following being the California localities most distinguished for these natural products: Steatite saponite or soapstone, a good fire clay, reported as occurring near Mokelumne Hill, Calaveras county; at the town of Antioch, in the claims of the Black Diamond mines, Contra Costa county; in the Como Grande mine, Inyo county; at Lincoln, Placer county, and at various places in El Dorado, Mendocino, Santa Barbara and Los Angeles counties.

Clay from some, if not all of these counties, has been made into fire-brick, crucibles, etc., and is found to answer well for these purposes. While some of the trials of California fire-clays have turned out badly, others have proved successful, and most of our fire-brick could be made at home. The price of the imported asked here ranges from \$35 to \$45 per thousand, that of domestic manufacture being about one-third less. A clay found in Brigham canyon, and at other points about Salt Lake, has been used extensively and with satisfactory results at the large smelters operating in Utah. A species of sandstone quarried in Red Butte canyon, near Salt Lake, has also been employed for building furnaces. Deposits of Kaolin have been found in this State, but have not been utilized as yet. Clays suitable for the manufacture of stoneware and the more common kinds of earthenware, are common on this coast, so there are several potteries in California, Oregon and Utah. The principal one in this State is at Lincoln, Placer county.

SOUTHERN PACIFIC.—Mr. John Hambleton, of Tulare City, who has just returned from the Needles, on the Colorado, writes that the new hotel and round house put up there by the railroad company are the finest buildings on the road. The Needles will be, he thinks, a mining center in time as there is a mineral country all round, on both sides of the mine. The scenery is beautiful along parts of the road. The road from Posie creek to Soledad will be started before long as the surveyors are at work on it now. Mr. Ambrose has said he shipped material out to Lardo. He says the road will start from that point and go through the Lawlers pass, south of the Pelona pass some four or five miles.

There are now two lines of daily stages to the Quijotas mines from Tucson, with fares respectively at \$7 and \$9 apiece.

Young Men's Scientific Society.

A movement is on foot to organize an association for the purpose of mutual intellectual improvement among young men. Its principal aim and object is the securing of a better and more general knowledge of all branches of science. Lectures are to be given before the society (illustrated by apparatus, etc.) by acknowledged professors in the various branches of science. Members are also to lecture before the society. Exercises are to be prepared and participated in by the members that will lead to the principal objects as given. The society to be of the nature of a deliberative assembly, and to conduct all of its proceedings according to strict parliamentary rule, and to be governed by a constitution and by-laws. It is proposed to have the society possess features that constitute the essentials of an "academy of science," "geographical society," "microscopical soci-

Long Hole Drilling.

The long hole process of sinking by the diamond drill was successfully used at the Pottsville (Norwegian) deep shafts. The main hoisting shaft is nearly 1,600 feet deep. The size of rock cut was 13 feet 10 inches by 16 feet. The other shaft is 25 feet 8 inches by 13 feet 10 inches. Four drills were used, each boring an inch and three-quarter hole, and from 200 to 300 feet deep. In the hoisting shaft 25 holes were bored about 3 feet 3 inches apart in one direction, and 4 feet apart in the other.

When completed the holes were filled up with sand and the drills were removed. The miners then commenced blasting by removing three or four feet of sand from the holes and firing them in groups. The process was continued until the bottoms of the holes were reached, when the drills were again charged and the work of drilling recommenced. A central group

Indian Signals.

We recently made an extract from the publications of the Bureau of Ethnology of the Smithsonian Institution, and gave an engraving of a form of Indian signaling. That represented an Indian signaling "Who are you? I do not know you," and the answer giving the tribal signal of "Pam."

These signals are actions or manifestations intended to be seen at a distance, and not allowing the minuteness or detail possible in close converse. Signals may be executed—first, exclusively by bodily action; second, by action of the person in connection with objects, such as a blanket, a lance, or the direction imparted to a horse; third, by various devices, such as smoke, fire or dust when the person of the signalist is not visible. When not simply intended to attract attention, they are generally conventional, and while their study has not the same kind of importance as gesture signs, it possesses some peculiar interest.

The discovery of enemies, or game, or anything else, is announced by riding rapidly to and fro in a circle. The idea that there is a difference in the significance of these two directions of riding appears among many of the Dakota Indians of the Missouri valley to be erroneous. Parties away from their regular encampment are generally in search of some special object, as game, or of another party, either friendly or hostile, and when that object is found the announcement is made in either of the above ways to their companions. The reason that a horseman may ride from side to side is that the party with whom he desires to communicate may be at a particular locality, and his movement—at right angles to the party—may be perfectly clear.

Should the party be in small bands he naturally rides in a circle so all can see him.

The latter was noticed by Dr. Hoffman in 1883 at the Yellowstone river. The Indians had concentrated after their first repulse by Gen. Custer and taken possession of the rocks and bluffs across the river. As the column rode up one Indian was seen on a high bluff riding rapidly in a circle and occasionally firing his revolver. The signal announced the discovery of the coming force. Riding in a circle he produced a lateral movement visible from any point.

THE OUTLOOK SOUTHWARD.—William L. Calhoun, Mining Recorder of Jordan District, an experienced miner and prospector, and familiar with the country south to and some distance beyond the southern terminus of the Carson and Colorado Railroad, recently returned from a three weeks' tour of observation in that section, and says that neither the business nor mining outlook along the railroad begin to compare with those of Jordan, Homer, Tioga and Prescott districts, and of western Mono generally.



INDIAN SIGNAL OF DISCOVERY OR ALARM.

ety," "society of natural history," etc., etc. It is stated that assistance is promised from such prominent men as Judge Heydenfeldt; Andrew J. Moulder, Superintendent of Public Instruction; Prof. LeConte, of the University of California; Dr. Geo. Hewston; Carl Seiler, Superintendent of California Electrical Works; Prof. Volney Rattan, Professor of Physics, Botany and Chemistry, Girls' High School. A circular has been issued by Mr. Ben Armer, of 306 Sacramento street, asking the co-operation of young men.

The Eureka Consolidated and Richmond Companies have just lowered the rate for reducing ores at their furnace to \$12 per ton. They also advertise to pay 67 per cent of the assay value of the silver and 80 per cent of the assay value of the gold in the ore. They also offer 20 cents per unit for all lead contained over 20 per cent.

A SUBSTANTIAL pledge of peace has been offered by the Apaches at the San Carlos Agency in the persons of fifty-five of their children, who left Wilcox for the Carlisle training school,

of holes was always fired first and the outside rows afterward. The outside rows of holes squared the shaft up nicely, so that little trimming was required, although many of the holes were not perpendicular and some were not straight.

An attempt was made in 1875 to sink the Hams deep pits in South Wales by the diamond drill, but after working the shaft from 175 yards to 244 yards this process was abandoned. In working large shafts the long hole process is expeditious, but the financial results do not seem to be satisfactory. For shafts, however, of moderate depth the long hole process might give satisfactory financial results; but, as stated, experience so far shows the system to be expensive.

MAJOR POWELL, of the Geological Survey, in his report for December, says that during the month Gilbert Thompson and Mark Keer, aided by their assistants, have continued the platting of material collected in California during the field season. Two square miles have been added to the surveyed area of the New Idria Mining Company.

CORRESPONDENCE.

Montana Mines.

EDITORS PRESS:—Thinking the numerous Montana readers of the Press would be interested in learning what was being done in this locality in mining and reducing ores, I have made a brief examination the past week, and the facts gathered are herewith given.

At Comet everything bears the impress of prosperity. Business men all appeared to be cheerful, and were doing a fair amount of business. There is no building going on save an addition to the hotel of Capt. Parkinson, which was necessary for the comfort of regulars and transient guests. The Comet mine is looking better than ever. The output is eighty tons every twenty-four hours. The mine is well opened with shafts and levels. The estimate of ore on dump is 2,000 tons, and there are not less than 1,000 tons in sight in the mine. The concentrator, which has just been remodeled and enlarged, handles 80 tons per day. The concentrates are hauled to Wickes, a distance of four miles, where it is put upon the cars of the Jefferson County Railroad in bulk, from whence it is shipped direct to Newark, N. J., for reduction. An average of nine carloads per week are now shipped.

The Rumley.

Adjoining the Comet, is a fine mine, and carries both free milling and smelting ores. The output is about 30 tons per day. The ore is hauled to Wickes, where the free milling is put through the mill at the rate of 20 tons daily. The base ores are roasted in Buckner furnaces and will be smelted as soon as the new furnace is completed, an event looked for by the 11th inst.

The Chester lead, in the vicinity of the Rumley, is owned by Mr. J. T. Parkinson. It is developed by shaft 51 feet in depth, and a cross-cut at the bottom shows 15 feet of rich carbonate ores, which contain from 60 to 80 ounces of silver per ton. It has only been represented, because there has been no opportunity of selling the ores or having them reduced. This state of affairs no longer exists. The owner will ere long begin working systematically.

The Pilot, the property of J. T. Parkinson and John T. Murphy, is an old location. It is developed by shaft to a depth of 971 feet, and levels run a distance of 40 and 8 feet respectively. The average width is 11 feet. Average assay, 60 ounces per ton. The ore is oxidized iron and galena.

Other Mines.

The North Pacific is an extension of the Rumley, and is owned by the same parties as the Pilot. It has been opened in half a dozen places to a depth varying from 4 to 8 feet. In one place the lode is 30 feet wide. Character of ore, galena. A tunnel has been run a distance of 280 feet, and is now within ten feet of the ledge.

The Baltimore is near the last named. It is a very promising prospect—owned by Sam Mackey; depth of shaft, 60 feet; width of lode, 7 feet. A tunnel 350 feet in length reaches within 30 feet of the ledge.

The Silver Crown lies about one mile from Comet. It is developed by shaft to a depth of 50 feet. A level has been run a distance of 40 feet, showing an average width of ore of 30 inches. The ore is mostly free milling. There are spots of galena and black sulphurets. Numerous assays show an average of 80 ounces of silver per ton. Mr. John F. Pating, the owner, has had sampled in tons select ore showing 200 ounces per ton, and has 50 tons second class on dump, averaging 40 ounces per ton.

The Wilber shows a similar class of ore as the above—is about the same width and a supposed extension of the Silver Crown. It has been opened by a shaft 65 feet in depth. There are many other lodes near Comet that are being developed, and most of them are very promising. New reduction machinery is being put up in the heart of this belt of mines, which has already given new life to development and prosperity.

At Wickes there is a new departure. The 15 stamp mill is running already as before mentioned. The concentrator has been torn out of the old works and part of the machinery taken to Comet and placed in the concentrator at that point. On account of the unfavorable location of the works, it is not probable that any more machinery will be put in.

Harbon is a New Camp.

Situated about one mile west of Jefferson City. A concentrator is being erected of a capacity to reduce 125 tons daily. This has been erected for the express purpose of reducing ores from the Alta. The machinery is of the most approved pattern from the Fort Scott, Kansas, foundry.

The Alta is the best developed mine in Jefferson county, if not in all Montana. The daily output is about 60 tons. The ore is now hauled from the mine to the concentrator—one mile—but it is in contemplation to construct a tramway so soon as the weather permits. Mr. Lyman Rumley, an experienced and able miner, is foreman of the Alta, and he is certainly the right man in the right place.

The concentrators are Comet and Corbin; the reduction works are Wickes and the Rumley. Comet and Alta mines are the property of the Helena Mining and Reduction Company, D. C.

Corbin, Esq., is General Manager, Mr. Langmaid, Superintendent, and Mr. Gilbert Assistant-Superintendent. It is estimated that more than half a million of dollars have been squandered on these mines and reduction works the past eight years, owing to inefficiency of the management. The new company is composed of energetic business men who have abundance of capital at command and a disposition to run the works and mines for all there is in them. JAY C. KAY.

Jefferson City, Montana, Jan. 15, 1884.

Elko Mines, Nevada.

[From our Traveling Correspondent.]

EDITORS PRESS:—The Elko county mines, located in early days, were many of them simply located and one year's title made to them, and then neglected to follow some new attraction. Men of more means were making more permanent developments.

About 18 miles from Elko, to the west, and a little south of the Tuscarora stage road, is the Lone Mountain or Merrimac Mining District, located in '69, though little work was done till '79, and even yet the district is not at all prospected. This season, however, there are parties contemplating more thorough work than has yet been done. This district is rich in copper, as indicated by the specimens I saw, and the copper as I saw it taken from the scowier assay as made in the assay room of the School of Mines.

The samples I got from Mr. W. J. Morris, who is interested in some of these claims, were good copper ores. He has so far prospected by shaft on a contact vein lying between granite foot wall and limestone hanging wall. The outcrop of this vein is traceable for more than a mile over the foothills of this district. At a depth of 60 feet no water, but a full 3 feet of pay ore, and width of 5 feet between walls. The assay value in copper and silver is nearly \$200 per ton.

The access to the mine is easy from the Elko road, and it is only three miles to a large stream of water sufficient to run a smelting furnace. There is also another stream of water in the district of about 200 inches.

Sage wood is near and plentiful, but larger wood is to be had about 14 miles distant. I was told that all the needed fluxes are plentiful within the district. By two miles grading an excellent road of only eighteen miles length is secured to Elko. The ores are principally copper glance, red oxides and gray copper, and are considered easy smelting ores.

I was not able to visit Railroad district to the south of Elko, but she is able to speak for herself, as her crude copper-silver bars can be seen piled up at the depot awaiting shipment. It, too, is gradually moving on and contributing a small share to the world's stock of useful metals. Many old locations in various quiet districts will now be looked after. The outlook is more encouraging than for some years back. The improvements in processes of working and reduction on ore transportation has given some new encouragement. From Reno to Deuver, where formerly \$45 was charged, the freight is now reduced to \$15 per ton.

B. W. CROWELL.

LITIGATION NOT ENDED.—Although the decision of Judge Sawyer was against the miners on all points in the late case, it does not follow that this will end the litigation. The mining interest is too great; the capital invested is too large a sum; the welfare of too many communities involved; and an existing belief that there are equities on the mining side of the question that will not admit of giving up the contest until the United States Supreme Court, the last tribunal of judicial resort, has passed upon the case. To this and the mining communities of the State, which are all, to a greater or less degree, interested in the question, should give assistance. Heretofore the litigation enforced against the miners has been cared for by the State Miners' Association; had it not been for this organization no one company would have been able to have carried on the contest which has been made. The expense has been enormous; but yet the magnitude of the property interests involved justified it. To take an appeal to the United States Supreme Court, other large expenses will necessarily be incurred; to meet it the hands of the State Association must be strengthened. There should be the organizing of local associations in every mining county, by means of which funds can be collected, and more complete unity and understanding among the people be brought about. Heretofore the people, believing in the justness of their cause, have not taken the general interest in sustaining the association that they should have done, believing that the decisions of the courts would be favorable. Now that the Sawyer decision strikes a blow that will result in the most disastrous consequences if not averted, the people of the mountains must all stand together and fight this question to the end, the Supreme Court of the United States, where, if the miners have any legal rights they will receive full recognition.—G. V. Union.

BORAX MARKET.—Something is up in the borax market, it is hard to tell just what yet. Prices in Liverpool have dropped 20 per cent. New York is pretty firm, however. It looks as though there would be a struggle. Smith Brothers and W. T. Coleman, the largest manipulators on this coast, are out, and the chances are for war.

Gold Quartz for Jewelry.

The Call has an article on the subject as follows: Among the growing industries of our State, the manufacture of quartz jewelry deserves notice from the fact that it is a San Francisco specialty, for as much of it is made and sold in this city as in all the rest of the world, probably. In the pioneer days, small nuggets of peculiar shape were favorite ornaments with either sex, their mountings being confined as a rule to pins, rings, brooches, ear-rings and watch charms, but these nuggets have almost entirely disappeared since the miner's cradle song is no longer heard in the land, and their place has been usurped by the free gold-bearing quartz which is produced in many of our mines. So great has become the demand for this quartz jewelry of late years, that those who manufacture it often find the supply of proper material inadequate to their needs, and attempts have been made to replace the genuine with an imitation article. Up to the present time, however, these attempts have been unsuccessful, for the counterfeit gold quartz bears upon its face such tell-tale marks of forgery that no one who has ever seen the real one can be deceived for a moment. Some years ago a man by the name of Thiery thought he had discovered the secret, after a long series of expensive experiments, but experience proved that he had lost both time and money. His plan was to subject non-mineral bearing quartz to an intense heat until it was reduced to a fluid condition, and then to throw into the molten mass small lumps of heavily alloyed gold, and then to mould, or, after it had cooled, to run the fused composition into the required shapes. The result was satisfactory so far as the mingling of metal and stone was concerned, but a complete failure as a fac-simile of the thing it was intended to represent, for the quartz was reduced to a milky, glass-like appearance, that was anything but natural.

The Latest Effort

Made in this direction has just come to grief, and is another added to the numerous instances of duplicate invention to be found in the Patent Office at Washington. Messrs. Ledue, Connor and Laine devised a method for imitating gold or other mineral quartz by the use of electricity, and applied for a patent, but found, to their astonishment, that an almost identical patent had been issued to a New York man nearly fifty years ago. This, of course, prevented their obtaining the desired letters, although no evidence could be found that the original patent had been intended for jewelers' use, or for that matter, had ever been utilized at all. Notwithstanding the fact that they could not secure a monopoly, the parties in question thought they could make money out of their theory by putting it in practice, and advertised themselves as manufacturers of jewelers' quartz. Like every other effort, however, this one has proved so unsatisfactory that it has been abandoned. In the first place, the imitation was palpable, and in the second, the false ore cost very near, if not quite, as much as the genuine. It is asserted, with what truth only the parties themselves can say, that several jewelers in this city have wasted considerable sums of money in the manufacture of bogus ore, and this fact simply proves how large an amount of the simon pure is used, as each individual piece of quartz set as a jewel can have, at best, but a small intrinsic value. Such jewelry is worn as a curiosity, and a comparatively small amount of it only is sold to resident Californians—for personal wear, that is—the great bulk of it being purchased by visitors from the East, or as presents for Eastern friends. In one establishment where a great deal of this jewelry is manufactured, the manager states that most of his sales are made during the late spring and summer months, and that the demand has been so great at such times within the past two years that almost his entire force of workmen has been employed in supplying it, and that his sales would have been much greater had the necessary material been obtainable. Further evidence of this last statement will be found in

Prices Paid for Such Quartz

As is available for jewelry. The free-bearing ore used for this purpose must have its gold so perceptibly massed that it will present a handsome appearance when set in a trinket, and it is only by sorting over tons of valuable ore that a small quantity of these special pieces can be found. The gold found in California quartz averages in value about \$16.50 an ounce, but the jewelers buy such ore as they can employ at the rate of from \$20 to \$30 for each ounce of gold it contains, the price varying in accordance with the beauty of the specimen. Without devoting a great deal of time to hunting up the statistics on this point, it would be impossible to give even an estimate of the aggregate amount paid by our jewelers annually for their quartz, but a hint may be found in the fact that during the past year one lapidary, who employs a very few assistants, purchased nearly \$10,000 worth of ore, while during that period the manufacturing firm above mentioned expended nearly \$15,000 on the same material. The supply, to a certain extent, keeps pace with the demand, for the large prices offered for handsome specimens make a more careful search for such specimens profitable to the miners and mill-owners. To a considerable extent the jewelers are supplied directly from the mines, but a majority of their ore is

obtained through a prominent assay office in this city, where the collecting of this kind of quartz is made a specialty. Great care has to be taken in its selection, for the stone used must be solid enough to bear the rough treatment of saw, chisel and polisher, all of the ore being brittle, while much of it is so friable that it would crumble to pieces under the jar of the instruments. For this same reason, all the pieces set in jewelry or cabinet work are small, the largest that the writer has seen being only four inches long and two inches wide, and those were referred to as of extraordinary size. The saw hangs so in the gold that it is apt to split the wafer-like slabs, as they are being cut from the parent rock. Not more than one-half of the ore purchased finds its place in golden settings, as the other half has been wasted in the preparing—wasted for ornamental use; that is, for the dust and chippings are of course smelted and robbed of their precious metal.

Determining the Gold.

The method for determining the amount of gold contained in each piece of quartz has been greatly simplified by a well-known assayer in San Francisco, who after long years of practical experience and careful study, has arranged a standard table, which shows to a fraction the proportionate weights of gold in a mass of auriferous quartz, when the specific gravity has been determined. To obtain the latter, the ore is first weighed in air and then in water, and the difference being divided into the large sum gives the specific gravity. To explain this more clearly, let us study the process upon a certain lot of ore: In the air it weighed 1,504.5 ounces, in water 956.35. Subtracting the latter sum from the former, we find the difference to be 548.12, and, dividing the last into 1,504.50, we discover the specific gravity to be 2.75, or, in other words, that the auriferous quartz in question is two and three-quarter times heavier than water. Having arrived at this result, we turn to Mr. Price's table, and after a simple calculation, determine the fact that the 1,504.50 ounces of quartz contain exactly 95.08 ounces of gold. This gold in the market was worth about \$1,570, while a jeweler paid for the ore \$2,375; that means that he paid \$805 more than the miner would have obtained at the mill, this large surplussage arising from the fact that the ore was especially well suited to the jeweler's use.

The Designs Used.

When mineral bearing quartz was first utilized for ornamental purposes, and that dates back to only a few years ago, it was fashioned into simple shapes and was modestly mounted, but as the taste for it increased, so did its intricacy of design and elegance of setting, until at the present day it is employed in every conceivable form of jewelry, and in other articles of personal or house adornment too numerous to mention. Coming in the distinct colors of white, black, red and blue, with many of the shades between, and sparkling with its gold or silver, it offers rich material for artistic combinations of color in the ornamenting of gold and silverware of all descriptions. It is also paneled in certain kinds of furniture, its effect being in such cases greatly enhanced by the added colors of iron and copper pyrites, of cinnabar and other rich-hued mineral or barren rocks. Into many other forms than these is the gold-bearing quartz fashioned; such as into cane-heads, perfume bottles, parasol handles, fan sticks, etc. An estimate of the selling value which jewelers put upon it may be based upon the fact, that according to size, but without regard to the metal in the stone, they charge for the gold quartz setting in a ring from \$2 to \$2.50, and these settings are scarcely a tenth of an inch in thickness.

In conclusion, it may be truthfully said that this young industry has already added many thousands to the product value of our mines, and that it gives lucrative employment to a large body of skilled mechanics.

REPORTS FROM A PROSPECTOR.—Day before yesterday we met Mr. W. F. Terris, of Providence, in town. He informed us that he had been out prospecting for several months among ranges of mountains that had hitherto been unprospected. He prospected the Kane Spring range northwest of Danby to within a short distance of the Colorado river. He found no mineral deposits, and no signs of water with one exception, until after the rain storms, when small quantities of water were found in "tanks." Limestone and iron are the principal characteristics of the mountains in that region. He discovered a large mountain of iron rock, and if it is of value for commercial purposes it will afford an inexhaustible supply of iron ore. From Mr. Terris we learned that Mr. J. P. Van Winckle and Joseph Boland have discovered a fine looking prospect eighteen miles southeast of Danby station. The ledge is located in a limestone range. The vein has been stripped for a distance of 100 feet, showing an average width of three feet, the foot wall consisting of porphyritic granite, and the hanging wall of slate, running east and west. Very little ore has been taken out. Assays taken so far range from \$50 to \$800 per ton. The indications are that there is a large body of ore there that is, principally low grade. A spring of brackish water is situated within three miles of the mine. The mine is called the Grand Central. A good, natural wagon road leads to it from Danby. The owners are confident they have a good piece of property and are preparing to sink a shaft on it.—Calico Print.

MECHANICAL PROGRESS.

Method in the Workshop.

Method, or system, is a workshop virtue which all touch upon. This is not given to all men to possess. Some men have no system; they are always in a muddle. At times they get hopelessly blocked, and others have to put them straight. Method implies foresight and a logical mind. A man must think of his work, and arrange it beforehand to the best advantage. A workman manager without method is useless. He will have his smithwork done before his patterns are begun; one set of men will be waiting for another set; his work will always be behindhand, and the cost of production greater than that at works where there is a good system.

Business is, perhaps, not so apparent a virtue as the others we have mentioned; but every foreman or manager knows how pleasant it is to deal with a workman ready at taking a new idea, or willing to try a new method of doing work. These are the men who distinguish themselves, and obtain better positions than those who cannot move out of their rut of habit. So also a firm becomes noted for adapting itself and its resources to new trades or methods of doing work, while a firm which will not try an experiment will be pushed out in the cold in the struggle for existence. Knowledge of the principles involved in workshop practice is the last of the workshop virtues we shall refer to. The man who knows the reason for what he does is a better man than he who does a thing because he is told to do it a certain way. Every mechanic should understand, for example, why his drill should run faster for a small hole than for a large one; why one speed of tool is suitable for one metal and not for another.

If he is a smith he should know why steel is worked at a lower heat than iron; what conduces to a sound weld, and why a piece of steel broken haphazard off a bar cannot be drawn to a sharp point without certain precautions. There are principles underlying every trade which it is to the interest of every artisan to study, to ponder over, and even to discover, for it is well known that there are principles yet undiscovered which the cultivator of the various workshop virtues may be lucky enough to fathom, with honor to himself and benefit to mankind at large. —*London Mechanical World.*

Interesting to Workers in Metals.

Professor Egleston, of Columbia College, New York, has written the following letter to the editor of the *Mechanical News*: "For some years past I have been making investigations on metals and alloys of all kinds, and have arrived at a point where I am very anxious to secure specimens to investigate the effect of compression. Will you be good enough to announce the fact through your journal and ask the manufacturers of metals and alloys of any kind to send me specimens for that purpose. The specimens which I wish for the investigation of compression are, first: Three pieces, two inches in diameter and three inches long for each examination; second, two pieces, each one inch in diameter and four inches long; and third, about three pounds of clean filings of the same kind of metal or alloy as the specimens sent. I should like to make at least three examinations of each metal, which will make fifteen pieces in all—nine of the larger, six of the smaller and nine pounds of filings.

As these investigations of compression are made at very great cost, and as I am making them for scientific purposes only, without remuneration of any kind, in the hope of discovering some facts which will be useful to manufacturers, I shall be very glad to make besides comparative tests other than compression; and also analyses of the metals and alloys for their actual cost to me, making no charge for my time or services. The results I have already obtained are such as lead me to believe that the results of the investigations I am about to make will be of great interest to all persons using metals of any kind for construction. A few very liberal gentlemen and firms have supplied me with the amount necessary for the investigations on compression, but I have no funds to make the comparative tests on tension, torsional or transverse strain, and I therefore am willing to do them for their actual cost to me, and request your kind interest in making my purpose known to your readers, and asking their assistance.

LATHE PULLEY FACES.—Machinists have often noticed the edge wear of belts on pulley steps of lathe cones, caused by the riding or the rubbing of the belt on one step against the rise of the next higher step; and this creeping up notwithstanding the swell or crowning of the face of the pulley step. A recently noticed remedy is one that is applied by the Pratt & Whitney Company, Hartford, Conn., on all their lately built lathes—a remedy as simple as it is effectual. The crown of the pulley face is not in the center, but on the "off" side, or toward the next lower step, away from the adjoining rise. By practice it has been found that this diversion from the center is too slight to affect the eye, tho' off on a step of 2½ inches for a 2½ inch belt being only ¼ of an inch; but it is an effectual remedy. The crowning of the

faces is effected by equally simple means. Machinists generally know the Slate taper attachment to lathes, which guides the tool carriage independent of the traverse screw, in turning or in boring tapers. The arrangement for producing the swell is on the same principle, the traverse screw being removed and the upper portion of the carriage with the tool post being held by a flat spring at the back of the lathe against a former, a slightly swelled strip to correspond with the intended crowning of the face of the pulley step. This is the last turning operation on the lathe cone, the former clips being in line or level.

PAINTING IRON.—The following experiments on preservatives for iron have been made under the auspices of the Dutch State railroads: Sixteen iron plates were pickled in hydrochloric acid, then neutralized with slaked lime, rinsed in hot water, and while warm rubbed with oil. The same number of plates were cleared of scale, so far as it could be removed by brushing and scraping. Four plates from each set were then painted alike—namely, four plates with coal tar and four plates with iron oxide A, another set with iron oxide B, and the remaining set with red lead. They were then exposed three years, and the results observed were as follows: The coal tar on the scrubbed plates was quite gone; that put on the pickled plates was inferior to the others. The iron oxide A on the scrubbed plates was inferior to the other two, while on the pickled plates it held well; the oxide B was found superior to that of A, but inferior to red lead, while the plates covered with red lead stood equally well on both prepared plates, and were superior to all others. From these results it is evident that pickling the iron removes all the black oxide, while scrubbing does not. It is also shown that the red lead unites with oil to form a hard oxy-linseed oil acid soap—a harder soap than that given by any other combination. The red lead is shown by these experiments not to give way under the scaling; it is more adherent to the surface, more elastic and cohesive.

A MECHANICAL TEST OF COKE.—The *Cleveland Trade Review* has the following interesting statement: "The fact that a great deal of bad coke finds its way into the market has called for some kind of a mechanical test, whereby its real value for iron-smelting can be arrived at, practically and accurately. Of course chemical tests can be made, but these are not always attainable or satisfactory in practice. To meet this want, a Cleveland furnace manager has been experimenting with a mechanical testing machine of his own device, upon half-inch cubes filed out of different varieties of coke, with very interesting results. We cannot yet present those results in figures, but enough has been accomplished to demonstrate that the furnace value of the coke is in direct proportion to its ability to resist pressure. In other words, the longer it has been burned, up to a certain limit, the better it will resist mechanical pressure, and the greater its value for smelting purposes. The device used is in form an ordinary testing machine, with lever combination. Cubes of the size stated (half an inch face) were found to be of the best size for testing. The results of these experiments will be awaited with interest by iron workers generally."

A NEW ROTARY ENGINE.—An announcement is made from Stevens' Institute of Technology, of considerable importance to mechanical engineering science. A Noteman rotary engine was placed there recently for experimental purposes, and accomplished results which Professor Thurston states in his report, will probably surprise other engineers as much as they surprised himself. The tests consisted in the determination of the gross and net power of the engine by an indicator and dynamometer, the consumption of water and steam, the friction of parts and of the engine as a whole, and the action of the inertia in the production of unbalanced stresses. For more than fifty years inventors have vainly endeavored to construct a rotary engine sufficiently light to run with economy as to steam and friction. It was found that the Noteman engine's "consumption of steam, and consequently of fuel, was vastly less" than that of reciprocating engines, and "it possesses minor advantages, such as fast running, reduced weight, and compactness as well as simplicity of general plan, and small cost of construction."

EFFECTS OF HEAT ON SAW TEETH.—A correspondent of the *San Mill Gazette* says: "Heating of saw teeth to a blue with an emery wheel injures the teeth. In the first place it destroys the temper; in the second place the emery wheel causes a surface glaze to form, which a file will not take hold of, and after swaging you are compelled to finish with a wheel; then you have a tooth without temper, on which you cannot get the keen cutting edge that you could obtain with a sawge and file." Another correspondent of the same journal says: "I have gummed a great many cross-cut and mill-saws with emery wheels, but when I consider the job finished I am very careful to leave all parts of the tooth bright where the wheel has touched it. Although the teeth are quite blue during the operation, I have never discovered that any injury is done, provided the blue is all ground off and the tooth left bright as if it had been filed. I see no reason why an inserted tooth should be injured more than a solid one."

SCIENTIFIC PROGRESS.

The Uniformity of Nature's Laws.

An interesting lecture was delivered recently before the Vienna Academy of Sciences, by Dr. W. Meyer, on the above subject, in which the lecturer explained that the latest astronomical discoveries showed very plainly the system upon which the universe is founded. Respecting the qualities of light, the Professor explained that it passes from all the stars to the earth with the same degree of velocity that the earth's light travels to the stars. The results of spectral analysis were resumed as follows: The analysis of the sun's light to the original shades of colors has shown us twenty-five chemical elements, which all exist on our earth also, and no wholly unknown matter has as yet been ascertained. The sun is composed of the same materials as the earth. The sun may be considered the mother of the earth. But the distant fixed stars are of a composition similar to and in many cases identical with that of the sun. The red stars are heavier than the white. Then the stars which appear as new to us, not having been observed in the heavens before, develop a glowing atmosphere of hydrogen around themselves. The nebulae in the firmament are caused probably by hydrogen and nitrogen, but it is possible that they are composed of a form of gas unknown to us. The warmth of the stars has also been ascertained. Red stars are the warmest, green stars the coldest, whilst the white stars have a medium temperature. The laws of gravitation are common to the whole system. This is proved by the so-called double stars, which revolve around each other by the same laws which regulate the movement of the earth around the sun. The law of gravitation is so plainly visible that the satellite of Sirius was not discovered until it had been ascertained that there was an attraction which worked its influence upon the star. The uniformity of nature's laws and the similarity of the materials composing the universe are a sufficient proof that there must be organizations similar to that of our system all over the universe. We see the results of these laws in the world we inhabit, and there can be no doubt that the same powers and the same materials have produced organizations similar to that of the earth in millions of other places, although we can but philosophically suppose their existence, not practically prove it. We must imagine that the earth is inhabited by a small family forming part of the great nation which peoples the universe.

THE GOSPELS OF WORK AND REST.—Dr. George M. Beard and Mr. Herbert Spencer almost simultaneously sound the alarm against our modern worry in the words "The gospel of work must make way for the gospel of rest." An English writer, signing himself E. S., protests, in the *Journal of Science*, against a theory of civilization which makes the acquisition of material wealth almost its sole object, and which brands all men not engaged in such pursuit as idlers. "We have under its inspiration stripped our own country, over a great and increasing part of its surface, of every beautiful feature. We have blackened its skies with smoke clouds, polluted its air with sulphurous acid, filled its streams with liquid filth, covered its hills with 'spoil-banks,' blighted its green fields, cut down its woods, and extirpated many of its most lovely animal and vegetable species. Our cities, from London downward, present, as their main feature, meanness, monotony and ugliness by the square mile, rarely, indeed, relieved by a street or building upon which the eye may rest without pain." The diseases caused by over-work, public morals, and the effect of our system on true intellectual progress, receive vigorous treatment. The author concludes that our industrial civilization is found wanting in every particular. "It has broken down more rapidly and more disastrously even than the military regime which preceded it, and will be found to have left upon the human race even deeper marks of its failure."

AN IMPROVED PHONOGRAPH.—One of the most interesting exhibits at the late Vienna Electrical Exhibition, was Gentilli's glossograph, a little instrument by which speech is automatically reproduced as soon as it is uttered. A small apparatus is placed in the mouth of the speaker—in contact with the roof of his mouth, his tongue and his lips—and on being connected with an electro-magnetic registering apparatus, the sounds are committed to paper. It is constructed in such a manner as not to cause any inconvenience to the speaker; neither is it necessary that the voice should be raised, as it reproduces a whisper as exactly as a shout; the only condition is a correct articulation. According to the inventor's calculation, it will be possible to write four or five times as fast by means of the glossograph as has hitherto been possible even by the quickest writer. At first sight it appears as if this invention was but an improvement upon Edison's phonograph; it is, however, of a much older date. It rests, unlike the former, on an acoustic principle, and does not reproduce the sounds in a microscopical form. The chief obstacle to the introduction of the glossograph will be the difficulty in deciphering the characters; but it is not impossible that, with the help of a second automatic apparatus, the characters produced

by the glossograph may be translated into our common type-writing. The orthography would doubtless appear strange, but in these days of phonetic spelling this might not long be a hindrance. —*Pall Mall Gazette.*

TELEPHONING OVER THE SEA.—Experiments were recently made on the large wire of the Postal Telegraph Company between New York and Meadville, Pa., a distance of 509 miles, with a telephone devised by Prof. Webster of Ypsilanti, Mich. Owing to the storm and atmospheric conditions the magneto bell was kept jingling by the induction alone, but there was little difficulty in carrying on a conversation.

What Prof. Gillett calls a ten-point instrument was used. Each point, Prof. Gillett says, is like adding another telephone in power. The feature of the receiver attached to the telephone is the increased magnetic surface presented to the diaphragm. Chicago, a distance of 1,010 miles, including a cable containing twenty-two wires, has been reached satisfactorily with a ten-point instrument.

One of the principal objects of these experiments was studying the possibility of constructing an instrument by which telephonic communication can be had across the Atlantic ocean as well as over long land distances. To effect this result, a twenty point instrument is being made for the purpose of ascertaining the distance it will reach. Prof. Gillett said that the French cable was 2,436 miles long from end to end, and the resistance was 2.89 ohms. The resistance of the wire used in the above experiment was 1½ ohms, but as satisfactory results had been obtained from the smaller copper wire, the resistance of which was six ohms. "We feel confident that before we get through we are going to say 'Hello!' and a good deal more, too, to the people on the other side," said Prof. Gillett. "What we are aiming at is communication at long distance."

THE NATURE OF ELECTRICITY.—Professor Thompson has shown how a series of floating magnet poles of like name, repelling one another, tend to produce equal distribution of the poles. Prof. Thompson, arguing from the second law of electrostatics (inverse squares), sought to explain the first law in a rational manner, on the hypothesis of self-repelling molecules, which tend to uniform distribution. When there is a surplus in one part and a deficit in another, the molecules are urged toward each other, i. e., attract. This was shown by putting a surplus of floating magnets at one part of the basin. By the movements of these magnets, when confined in barriers and with surplus and deficit purposely made, the author imitated the effects of a Leyden jar, induction, a battery current, etc., the motions and arrangement of the poles illustrating the hypothetical behavior of electricity. The author was led by the hypothesis to infer that either the ether is electricity, or that the ether is electrified, and the former seemed the simpler conclusion.

LOWER CALIFORNIA.—The southern part of the peninsula of California has recently been explored by Dr. H. Ten Kate, who reports that there are no longer Indians of pure race dwelling in that region. The blood of the ancient Periculis and Coras flows, it is true, in a great number of Metis, but they resemble the Spaniard far more than they do the Indian. A few relics are found in the graves, and here and there on the cliffs rock paintings are found. The paper concludes with an account of the finding in Sonora, Mexico, under large masses of lava, objects resembling fishes and turtles, some cut out of marble and others cut out of a hard green rock. Stone knives smoothly polished were found in the same locality, on the seashore and about twenty-five feet above high water mark.

FOUND IN THE GREAT DEEP.—The United States Fish Commission steamer, the *Albatross*, has worked in greater depths than have ever yet before been sounded with such heavy trawl, having dredged 2,949 fathoms, or about three and one-third miles, and brought up living creatures from this depth. It required 41,000 fathoms of steel rope to accomplish this feat and over three hours to pay it out. This in latitude 37.12 and longitude 69.39, about 300 miles from No Man's Land, or half the way to the Bermudas. At the bottom were found globigerina, or the soft ooze common at great depths, and several species of fish hitherto unknown to science. A peculiar scarlet shrimp about a foot in length, with an enormous quantity of eggs, each containing a large globule of oil, were found.

A DRY GALVANIC BATTERY.—Electro-piles without fluids were among the earliest forms invented, but they had but very little power, and although they last a long time, have very little value. They are now beginning to attract attention again, and C. Schneler, of Dresden, has invented one consisting of a copper cylinder open at both ends, in which is placed another open cylinder of amalgamated zinc. For filling, he mixes up plaster of Paris with a saturated aqueous solution of chloride of zinc, containing 7 per cent of common salt. A stiff paste is made in this way, and poured in the annular space between the two cylinders, where it soon hardens and sets. The electromotive force is not stated.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MINING ABOUT BUTTE CITY.—Amador Ledger, Jan. 26: The four-stamp mill of W. E. Stewart was moved last week from the gulch to a point below the Confidence mill. The Confidence mill has just got through with a crushing of rock from its own mine. The Mello Bros. have made arrangements to have a ton of ore from the ledge recently uncovered by them crushed at the Confidence mill. This is intended to test its paying qualities by mill process. That the rock carries gold in paying quantities there is no doubt. It is so exceedingly fine, however, that the question to be decided is whether it can be saved by the ordinary methods. J. Stewart has hauled a quantity of rock to the Confidence mill to have it crushed. Herman Tripp was to have started his one-stamp mill above Big Bar Bridge last week, but difficulty with water prevented it. J. Morgan and W. F. Detert, examined the Mello claim Thursday of last week, and were favorably impressed with it.

Calaveras.

MURPHY'S.—Calaveras Citizen, Jan. 26: Considerable activity is noticeable in mining matters in our immediate vicinity, and the outlook for a boom of some magnitude is very flattering, not only among us but throughout the whole mineral belt; indeed, good reports are coming in from every portion of the State, particularly from Mono county. In the Standard and Bodie mines a large rich body of ore has been encountered at a greater depth than yet found. And in the Clifton another important strike is reported. From these strikes more importance is attached to the finding of free gold and rich float, last summer in Alpine county, by a party of prospectors from Murphy's. Alpine county lies about 50 miles east from here, and at about the same altitude. The formation is similar to that found in Bodie. It is the intention of the same party to start for this region as soon as spring opens to thoroughly prospect the district. One of the most important strikes made in this vicinity for years, was made in the last two weeks by John Saltuary, an Indian creek, near Davis' ranch. The lode is two feet wide and is rich in free gold. It is estimated by experts that it will mill \$100 per ton. The vein is traceable 800 ft. The extensions are all taken up. There is no little excitement in regard to the find, and prospectors are out in force. The mills in this vicinity are all busily engaged in crushing ore with fair success. Murphys bids fair to keep up her bullion producing efforts and outstrip all the neighboring towns in a progressive movement in the march of improvements.

NOTES.—Calaveras Chronicle, Jan. 25: Very rich rock has been struck in the Carey mine near West Point. We were shown a specimen of the rock this week that for richness exceeds anything of the kind we have ever seen. The main shaft is now down 90 feet, from which levels have been run north and south. Width of ledge, 2½ feet. The mine is supplied with steam hoisting works. The mill on the Scorpion mine, near West Point, was started up Friday morning last. The mine is paying well. Extensive furnaces are soon to be erected in that district for the purpose of roasting the ore, as by this method it is made to yield a much larger percentage.

El Dorado.

NEW MILLS.—Georgetown Gazette, Jan. 25: The new ten stamp mill on the Eureka started up last Saturday without a hitch, and the perfect manner in which it works is the admiration of all. It is acknowledged by all familiar with quartz mills, to be one of the best mills they ever saw run; indeed, our people are delighted with it, and the universal sentiment is that Benjamin, the millwright, and Morey, the foundryman, are the men to put up a good mill every time. The mill is crushing about 25 tons of quartz every 24 hours. The Supt. will soon have the expenses of the mine brought down to a minimum, when he will be able to inform the owners what ten stamps will do for them. If favorable, two or three more batteries will be added right away.

THE MINES AT GRIZZLY FLAT.—Mountain Democrat, Jan. 24: A correspondent writes us that all of the mines at that lively camp are working full handed excepting the Flag Staff and Mount Hope; that the water is being kept out of the latter, and that one of the principal owners is expected from the East right away to start the mine up again.

THE SACRAMENTO MINE.—Arrangements are being made at this mine for the use of Burleigh drills in the tunnel to be operated with compressed air.

Fresno.

DEVELOPMENTS.—Fresno Expositor: The mining interest of this county are liable to have a boom this summer. Excellent developments have been made in the mines in Pine Gold district, and in others in the vicinity of Fresno Flats, while some good leads are known to exist on this side of the San Joaquin. The Mt. Raymond mines will probably come in for the greatest attention, as there is considerable talk in reference to them in mining circles. The San Pedro Company recently shipped 80 tons of ore from one of the Mt. Raymond mines, and had it worked by smelting process, and were rewarded with a yield of \$50 per ton. The ore is of the quality known as argenteiferous galena, or silver bearing lead. In fact silver seems to be a leading metal in all the quartz mines of this county. In the annual report of the silver output prepared by Wells, Fargo & Co., Fresno county is credited with a yield of \$20,000 in silver from its mines. The estimate is rather under than over, as all the gold taken from its mines is heavily alloyed with silver. Work has been resumed on the Mammoth mine on the eastern slope of the Sierra, in Mono county, but near the Fresno county line, and good pay ore is again being taken out, and there is a strong probability that extensive work will be carried on there during the coming summer. The North Fork mines, being in a direct line between Mammoth and Mt. Raymond will feel the influence of the activity in those districts, and of course considerable prospecting will be done

there, and we would not be surprised to see some valuable silver mines developed there. The reported sale of the Quartz mountain mine to a French company has not been effected. During the past year the quartz mine of this county have received some attention from mining men, and experts who have traced the precious metal belt claim that the rich formation that gave to Bodie its prosperity extends through the Sierra into the county of Fresno.

Mariposa.

BUENA VISTA MILL.—Mariposa Herald, Jan. 26: The new ten stamp mill at the Buena Vista mine started last week. Eight men besides the three O'Gorman brothers are at work in the mine and mill. There has been no recent developments in the mine, but a new level will be opened up 80 ft from the surface in about two weeks. They calculate that there is enough ore in sight to run the mill for five years without doing another stroke of dead work.

ENTERPRISE MINE.—Mariposa Gazette: The engine and boiler, which was recently sold at the Malone mine to satisfy creditors, was purchased by Ralph W. Barcroft, of Hornitos, for \$700. The boiler was new, and the whole outfit, it is said, could not be replaced for double the amount. The Malone mine, which was, at considerable expense, opened by John Mitchell & Co., was beginning to develop excellent ore, with a vein some two feet thick. Mr. Barcroft will remove his machinery to the Enterprise mine about three miles north of Hornitos. This is an old mine and bears a good reputation.

Mono.

THE DETROIT COPPER WORKS.—Bodie Free Press, Jan. 24: From reliable sources it is learned that the Detroit Copper Works, in Jordan District will renew operations as soon as financial difficulties can be adjudicated. The management will be entirely new and fully experienced in the practice of copper reduction. There is no doubt but that the concern can be made to pay handsomely, with somebody in the directorship who knows what he is doing.

A GOOD PROPOSITION.—It is proposed, among a few men who have faith that all the gold in the Old Mono Diggings has never been brought to light, to purchase an artesian well-boring apparatus and prospect the ledges in the vicinity where so much gold was taken out in 1862-3. The country rock is decomposed granite, which can be easily bored into. It is an experiment that promises good returns. The placer ground was wonderfully rich there, and there may be a bonanza for him who finds the fountain head.

COPPER.—Homer Index, Jan. 26: The joint shaft on the Mariposa-Coyote claims of W. L. Callahan and C. A. Wetmore, on Copper creek, some distance north of the old Detroit copper mines, in Jordan district, gives strong indications that there are larger and richer copper veins in that district than those worked by the Detroit Co. As the vein at the surface showed but traces of copper and was rich in gold, it was being worked for the last named metal, and in order to develop the mine for more economical working a tunnel was started near the base of the mountain to tap the lode at great depth. This tunnel was driven in 60 ft, but as the weather continued favorable for out-door work, the owners continued to resume sinking in their shaft on the vein, and the result is the development of a 7-foot vein of rich copper ore carrying a high percentage of gold. The Hyena, situated on the west side of Lake Canyon and believed to be the continuation of the Gorilla lode and owned by Mike Noonan and others, is being actively developed by tunnel following the vein in under the perpendicular wall of the canyon. The tunnel is now in about 127 ft, but is not yet under the solid wall, and hence is still in the disturbed portion of the vein, though the whole fissure (five ft in width) is filled with vein matter—a mixture of quartz, porphyry and clay—and in the last few feet run the quartz has rapidly increased in quantity, and prospects well. H. V. Pullen, who had the perilous adventure on the Mount Lyell glacier, has two locations on an immense quartz lode cropping out parallel and close to the southern line of the glacier, and trending down the mountain with the ice. The claims are called the Colorado and the Surrender. The Gem, on the northern slope of Mount Gilcrest, and owned by N. M. Parsons, of Bodie, is showing well in the tunnel being run in on the ledge by C. F. Caven and Joe Thompson, under contract. Bagby's tunnel, following the Grizzly lode into Mount Scowden, is now in 165 ft, and the vein shows marked improvement in the last ten feet. The May Lundy mill closed down yesterday afternoon. The mine is in charge of a watchman.

Nevada.

NEW YORK HILL.—Grass Valley Union, Jan. 25: In sinking a winze from the north drift of the 1300 level of the New York Hill, some specimen rock has been obtained in the last few days, the gold being free from the sulphurets. The indications are considered encouraging, and the winze will be continued deeper in the expectation of opening up a body of good paying quartz. The ledge from the north drift of the 1100 level, is also showing quartz of good quality and containing plenty of sulphurets. It is found that the ledge in the mine which went off quite flat from the foot-wall to the hanging-wall from the 1200 level is dipping again to the foot-wall, which is also another satisfactory indication that the mine will be all right upon deeper working. There is plenty of gold in the New York Hill yet to be brought to the light of day.

SLATE RANGE.—Work on the Slate Range mine, at Forest Springs, is going on steadily under the Superintendence of G. S. Brown. The shaft is down nearly 250 ft, showing a vein of varying width, from a few inches to two ft. A new level is being opened at the depth of 200 ft. The quartz extracted is crushed at Sothern's mill. The mine is paying expenses, which is doing well for a new venture.

THE PENNSYLVANIA CON. M. CO., the location of ground being east of Kate Hayes' Hill, and near the Empire mine, intend starting up work this season. The mine has upon it good hoisting and pumping works, and a two-compartment shaft sunk to the depth of 235 ft. These improvements were made two years ago by the Menlo Company, an eastern incorporation, that bonded the mine for \$40,000, but owing to the complications with other mining ventures in Utah, the company was compelled to suspend operations.

RICH GRAVEL STRUCK.—Nevada Transcript, Jan. 28: Some very rich gravel has been found in the

hydraulic mine of John C. Murchie, Sr., near town. We are told that previous to the Sawyer decision \$800 was washed out from a very small block of ground. Skiff and William Murchie will try the experiment of drifting the channel. If the gold continues as heavy and plenty as it is in the present face of the bank, the labor will prove profitable.

RICH STRIKE.—A strike of unusual richness was made in the Franklin mine, owned by Hussy & Hussy, at Willow valley. A blast in the face of the incline uncovered a fine body of ore, from which many exceedingly rich specimens were taken. From three tons of rock were selected three candle boxes of specimens, which it is estimated are worth at the rate of \$5,000 per ton. The ledge is 17 inches wide, well defined, and the general indications are most flattering, giving evidence of permanence and continued richness.

Plumas.

AN IMPORTANT STRIKE.—National, Jan. 27: The foreman of the men employed by the Eureka Co. in running a tunnel in the Halsted mine at Rich Gulch, was in town on Wednesday, and reports that the tunnel has tapped the ledge, being a little over 300 ft in length. The tunnel has only progressed in quartz about three ft, but everything indicated a strong vein, and it will probably be 20 ft to the opposite wall. Gold was found in every horn-full, but no very rich prospects had been obtained when he left. Mr. Johns, of Eureka, has been telegraphed to in regard to the developments, and it is thought that he will be here before long to take a look at the mine. The indications are that the company will take it, and if so a very important mining camp will be started at Rich Gulch, and another summer will see the old East Branch coming back to the life, bustle and prosperity which it enjoyed in the "good old times" of thirty years ago.

THE PLUMAS EUREKA.—From Surveyor Keddie, who was up at the Eureka Hill last week, we learn that the mine prospects are very encouraging, and that the ledges look better than they have for several years. A fine body of ore has been opened by the lower tunnel, and the "header" is now in good rock, with a good prospect of having a large pay-chimney in front. Another good body of ore is also being worked in the old '76 mine, now a part of the Plumas Eureka. Heavy hoisting machinery will be put in the lower tunnel, and the rock will be raised from a considerable depth.

DIRECTORS.—Greenville Bulletin, Jan. 24: A new board of Directors has been elected for the Plumas Consolidated mine, and there is a probability that work may be resumed there in the Spring. No new discovery has been made in the Lucky S mine, nor any other ledge found than was known from the first. In the drift from the tunnel the edge opened out sooner than was expected, the pitch being greater than had been estimated. The vein on last Saturday was three feet wide, and the ore richer than any before found in the tunnel. Progress with the drift is slow, as the rock does not blast out well.

THE BIG STRIKES.—Inter-Mountain, Jan. 26: On the 500 foot south level of the Lexington the ore shoot mentioned in these columns is opening up magnificently. It has now been explored for a length upwards of 200 feet and is found thus far to have a uniform width of six feet. "Cold blooded" samples across the face of each drift show it to carry over sixty ounces and the pulp assays in the mill give the same result. Considering the extent of the shoot it is one of the richest ever discovered in the Butte district and proves the correctness of all the reports thus far made on the permanence and value of the Lexington ore bodies with the attainment of depth. In the Mountain View an important strike has recently been made in the north 300 foot cross-cut, where on the foot wall of the north ledge a considerable body of good copper ore was discovered. One streak, which is more than a foot wide and is strong and compact, assays forty-two and six-tenths per cent. copper and \$20 in silver. On either side of this streak is good concentrating ore. On the 400 foot level the south crosscut has just tapped the ledge, which has so far been penetrated but a few feet. The strike in the north 500-foot crosscut is regarded as very important and sets at rest all doubt as to the presence of copper in that locality.

San Bernardino.

IVANPAH.—Cor. San Diego Union, Jan. 23: Ivanpah is situated in Clark mining district, San Bernardino county. Fenner, on the Southern Pacific Railroad, about 80 miles distant, is our nearest railroad station, from which point we get our supplies; also a tri-weekly mail. The Ivanpah silver mines were discovered in 1869, since which time they have been worked constantly. There are two mills here, a five stamp and a ten stamp mill. The former is owned by Julius Jacobs, of San Francisco, and the latter by your correspondent. The mines that are now being worked are the Lizzie Bullock, Nos. 1 and 2, Stonevall, Beatrice, Monitor, Eugene and Commercial. The silver mines here are not very large, but very rich—probably the richest average of any district on the coast. At the northeast of the silver mines, and about a mile distant, are some large and promising gold mines owned by Jones, Taylor & Co. Application has recently been made for a patent for them, and they will doubtless be worked at no distant day. At the north of us a few miles, just in the edge of Nevada, are some large lead and copper mines, among which is the old Potosi. I am told that George L. Centre, former Supt. of the Cerro Gordo mines, a well known mining expert, says this is the largest and best lead mine yet discovered on the continent. The mine carries some 15 ounces in silver to the ton. There are near this mine other lead mines not so large as the Potosi, but carrying more silver. At the south of Ivanpah, and in Clark's district, are some large copper mines, among which are the Copper World, Nos. 1 and 2. This group of mines would furnish a railroad a large amount of freight, as also would the Potosi district. Mine owners here are watching the progress of the California Southern Railroad, hoping it will come through this district. There is no place on this coast where so much base metal can be produced within the same circle as Ivanpah. Millions of tons are awaiting transportation.

Sierra.

GRAVEL.—Sierra Tribune, Jan. 26: The Table Rock gravel claim is located about three miles south of Howland Flat, and adjoins the Bonanza and Virginia claims. Fifteen men are employed at the mine under the superintendency of P. Dorsey. The

dumps are filled with fine appearing gravel. Washing will begin whenever a sufficient supply of water comes. At the Sunnyside gravel claim, located near Bunker Hill, a contract to run 150 ft of tunnel was recently let. The contractors have completed about 50 ft of the contract. The company expect to have to run about 200 ft further after the completion of the present contract before the pay channel is reached.

RESUMED WORK.—Messrs. Uren Brothers & Eldridge are preparing to resume work on the Rising Sun gravel claim, formerly bearing the name of Thompson's ranch claim, located a short distance west of town. A tunnel, which has been run a distance of 700 ft, was found to be above the channel. Another tunnel was run 160 ft at a still lower depth, but had to be abandoned owing to the quicksand encountered. The owners now propose to start a tunnel about 200 ft lower down the hill, from where it is believed that the lead can be successfully worked. From a shaft sunk in one of the tunnels, excellent prospects were obtained. The gold is of a coarse character, one piece found weighing half an ounce.

A MINE ALREADY PROSPECTED.—The Chipp's Flat mine is located about one and a half miles above town, and is owned by John Henderson. An eight stamp mill is built on the property. A tunnel was run on the ledge a number of years ago, and the upper portion of the mine was worked out at a good profit, the ore yielding as high as \$30 per ton. The present owner started a tunnel that will tap the vein in 700 ft at a depth of 200 ft below the old workings. Owing to the hard rock encountered in this tunnel, Mr. Henderson has found it necessary to abandon work for the present.

GIVEN A NAME.—The rich quartz ledge recently located near Deer lake by Messrs. Busch, Sanderhaus, Deidesheimer and Hughes, has been named the Young America. A tunnel was started on the vein to-day that will permit of its being worked to a depth of 200 feet.

THE BONANZA QUARTZ CLAIM.—The Bonanza claim is located a short distance above the Marguerite mine, near Loganville. A tunnel has been run on the ledge a distance of 75 feet. Forty feet of the tunnel has just been completed by contract. The vein has an east and west course, running parallel with the Marguerite ledge.

THE SIERRA BUTTES MINE.—A scarcity of water for milling purposes compelled the temporary discharge of a portion of the men working in No. 6 and 7 tunnels of the Sierra Buttes mine to-day. Work at the two lower tunnels will be continued with a full crew. In the meantime every effort is being made to get the new mill, at No. 9 tunnel, in running order as quickly as possible, as a sufficient supply of water can be obtained from the lower levels of the mine to keep that running. The managers are making the most of the present fine weather by pushing ahead work in an energetic manner on the outside. The ore-bin at No. 8 tunnel is nearly completed and the tramway to run from there to the mill is well under headway. The tunnel under the road, from the terminus of the tramway to the mill, a distance of 200 feet, is completed.

Tulomme.

ORE.—Union Democrat, Jan. 26: M. A. Hyde is getting the one stamp mill at the Golden Treasure mine in condition to start up. He has a quantity of ore on the dump, and plenty more in sight in the mine. Recently he had a small lot worked at the Patterson mill, which gave a return of \$62 per ton in free gold. In addition the ore is very rich in high grade sulphurets.

RICH STRIKE.—Independent, Jan. 26: App & Co., on Quartz Mt., came across a little vein of quartz on the surface in the main road, a few yards south of Whitney's store, which is literally alive with gold. Our informant states that there is at least \$20 to the pound of quartz. Thousands of men have lived and boarded around Whitney's while engaged on the extensive mines there, and the road has been traveled ever since the days of '49—and this hidden treasure is only just revealed. Scratch Tulomme on the back almost anywhere and you will find gold.

NEVADA.

Comstock District.

SIERRA NEVADA.—Enterprise, Jan. 26: The raise from the 2000 is now fast nearing the 2700 level. This connection will so change the draft and give such a circulation of air as will permit of the prospecting of several streaks of ore known to exist in the mine to the northward. On the 3100 level the northeast drift is of ore which is quite rich in gold. This streak varies in width from day to day, but is liable to lead to a deposit of value, as there are other streaks passed through in the joint Union Consolidated crosscut that are liable to be cut by this drift to the northeast. Several of the streaks already cut would pay well for working were they not cut up by many thin sheets of barren porphyry.

HALE AND NORCROSS.—The winze below the 2700 has now reached the 2800 level, and a sump is being sunk below that point. As soon as the sump shall have attained a proper depth, the work of opening a station and exploring the 2800 level will be commenced.

GOULD AND CURRY.—The Bonner shaft has been put in good repair down to the 1200 level, and the north drift is now being cleaned out and repaired up to the Consolidated Virginia line.

UNION CONSOLIDATED.—The same good progress continues to be made in the two drifts that are now approaching each other on the 3100 level. The two will soon be connected, when prospecting may be prosecuted at several points where ore is liable to be found.

ALTA.—Good headway is being made in the main east drift on the 2150 level, which is being pushed for the ore deposit as rapidly as possible. The west crosscut on the 2150 level will soon be cleaned out, when explorations will be continued in the vicinity of the west wall.

BEST AND BELCHER.—The ground in the bottom of the joint Gould and Curry winze below the 2500 level is still very soft, and requires close watching and close timbering. There is some water, but it does not materially interfere with the work of sinking.

MEXICAN.—General repairs are being made in all the levels from the 2500 down to the 3100, and

when the connection in the Union Consolidated is made and a good supply of air obtained, prospecting will be commenced at several points.

COMINATION SHAFT.—The new hydraulic pump, the air compressor, and all the other machinery, is now doing excellent work. Sinking for the 2800 level has been resumed, and the shaft will be pushed down to that point without delay.

OPHUR.—On the 150 level they are still extracting a considerable amount of ore, and besides are doing a great deal of prospecting.

CROWN POINT.—Owing to the low stage of water in the Carson river and the freezing up of the wheels of the mills, but a limited amount of ore is being extracted.

YELLOW JACKET.—All the ore that can be reduced at the mills on the Carson river is being extracted, and some prospecting work is being done.

UTAH.—On the 1750 level the northeast drift is making rapid progress in quartz that is beginning to give very promising assays.

Columbus District.

MAKING REPAIRS.—*True Figure*, Jan. 26: A force of eleven or twelve men has been engaged for the past week in repairing the lower mill of the Northern Belle company at Belleville. The entire machinery is to receive a complete overhauling and will be put in first-class order, but for what purpose, or what ore will be crushed, many inquiries develop not. At any rate it is gratifying to see the air of activity given Belleville, and its inhabitants are, for the time, contented.

ABOUT READY TO RESUME.—The new engine foundation at the Mt. Diablo hoisting works is finished and ready for the engine, which was sent to Carson for repairs and arrived here by last night's train. It will not be many days before the whistle at the works will add its melody and it is melody in a mining camp—to that of the Columbus Consolidated, and the work in the mine be resumed.

THE COLUMBUS CONSOLIDATED.—The main shaft has been sunk about 65 feet below the station of the third level, making a total depth of about 375 feet. The drift from the shaft on the third level was extended about 5 feet during the week, making a total length of about 40 feet. The rock in this drift still continues to be very hard. The drift from the bottom of the Bonanza winze, running to connect with the shaft on the third level, has been extended 10 feet, making a total length of about 90 feet. The face of the same still continues in broken up vein matter yielding fair assays. The crosscut running south from the lateral drift on the 150-foot level has attained a length of about 90 feet. It still continues in broken vein matter giving fair assays. Since the date of the last report there has been no material change in the work on first level. The work of extracting ore will be resumed as soon as the third level connection is arrived at. A new road is now being made to enable teams to go to and from the ore, which will be completed in a short time.

AN OUTSIDE OPINION.—Much speculation is being made by parties, in fact everybody in the towns of Candalaria and Piekhandle, as to what will be done and when, toward the resumption of work in the Northern Belle and Holmes mines, the former particularly. The editor of the *Hawthorne Bulletin* has been interviewing some of our merchants and says it was ascertained that the boom was not expected to reach the town before summer, but that when it does come Candalaria will be livelier than ever before. It is expected that the Northern Belle assessment will nearly all be paid, as its principal stockholders own about one-third of the Holmes stock, and will get their money back when the judgment is paid. Companies having money on hand intend to spend it in development work between now and July, and there is talk of a new leaching mill.

Eureka District.

BRIEF NOTES.—*Eureka Sentinel*, Jan. 25: The Colorado mine, for a long time lying idle, is now being worked with good chances of developing into a very productive and valuable property. It is owned by J. E. Jones, Herbert Davis, Griffith Jones, John Williams and John Evans, who are preparing for a season's work. They have a four-foot vein of ore and ledge matter to start on. The southerly portion of the mine was leased some time ago to John McNaughton and one of the Laird brothers, who have already shipped 30 tons of ore to the Eureka Con. furnaces that worked \$102 per ton. They have 40 tons of the same kind now on the dump, as well as considerable more in sight in the mine. Roberts Brothers have put up a patent Baker iron wharf at the Pentier mine, which works splendidly. The incline shaft is down 130 feet, and from the 80-foot level a drift, now in 60 feet, will be driven 40 feet further to the center shaft, which it will tap 160 feet from the surface. At the bottom of this shaft is an abundance of ore, which goes from \$100 to \$160 per ton. A contract has been let to P. F. McBride to run 50 feet of drift to the Connolly mine. Pat thinks there is a good showing for a nice body of ore in the vicinity of the drift. The question of building a refinery is being discussed by the Eureka Con. Company. It will have work for a long period in refining bullion obtained from the company's mammoth slag pile alone. The Grant mine will be worked in part for flux quartz ore. The ore from this mine is usually very rich. The Hamburg tributaries are still working successfully, and new pitches are being taken. Jo. Molino is taking out some good ore from the Altoona mine on Adams Hill. Prospects are improving in the Uncle Sam Con. mine on Peeltick Hill.

Patterson District.

THE NEW DISCOVERY.—*White Pine News*, Jan. 26: Our Hamilton correspondent sends us the following concerning the new mining discovery in Patterson District: Some time since Mr. Flowers, formerly of the Truckee mine, went out there and found the appearance of the locality quite favorable for mineral in his opinion. They went to work in a small open cut, which is by itself some distance up the mountain from where most of the original workings were made. With but little labor they found only a few feet to the left of the original cut, and almost upon the surface, the pocket or ledge—which ever it may be—that they are now in. They are still engaged stripping the deposit, without having reached its terminus. It is pitching downward, and they expect after a few feet further to go under the surface, which will be a great advantage at this severe

season. Mr. J. B. Mathewson and Col. Conter have been out there and speak favorably of the new find. C. A. Mathewson and Thomas McKinney are now making a prospecting visit there. Assays from samples of the ore brought to Hamilton, range from \$100 to \$1,484 per ton, the former sum being the lowest of any made. The mine is about one mile up the mountain from the original town site of Monterezuma, three miles from the now traveled stage road and nine miles from Parker's Station. The discoverers think they have a good thing, and everyone in this section will rejoice if such proves to be the case.

Tuscarora District.

INDEPENDENCE.—*Times Review*, Jan. 24: There is a slight improvement to note in the workings during the past week and the usual progress has been made in extending the drifts and crosscuts.

NORTH BELLE ISLE.—The tributaries on the upper levels are extracting some good ore.

ELKO CON.—Have resumed work on the main west crosscut, 200 feet level. North drift has advanced 10 feet, south drift, 8 feet.

GRAND PRIZE.—South drift on the 500 foot level, is in 111 feet—ledge is poor. Have been putting in new track in the 400-foot level, and will soon resume work in the south drift. Also in the north latera the 300-foot level. Mill is shut down.

NAVAJO.—The usual progress has been made with the work at all points. The stopes of the different levels are without material change. The usual amount of ore has been extracted and sent to mill during the past week.

Ward District.

PROSPECTS.—*Ward Reflex*, Jan. 24: Our mining prospects never looked better. The Argus has put on a full force of men and the mine is yielding splendidly. Twenty tons of ore per day are hauled to the mill for reduction, and I have been credibly informed that the ore works highly satisfactory. The Monitor Company has sunk to the depth of 105 feet, and ore at the bottom has been assaying from \$30 to \$100 per ton. R. M. Peters and John Morgan, after becoming satisfied with having struck an ore body dipping into the hill on the Hayes ground, have gone back about 100 feet and started a shaft. The indications are that the company will ship five bars in a day or two—its first shipment.

ARIZONA.

MINING MATTERS.—*Prescott Courier*, Jan. 24: The smelter, at Howell, twelve miles south of Prescott, is running. The Belle mine, which has, so far, furnished abundance of ore for this smelter, looks as if it will continue to do so for many years to come. Carr's freight trains are stretched out, hauling bullion from United Verde and coke from Ash Fork. There are at the smelter upwards of 200 tons of bullion.

NOTES.—*Pinal Drill*, Jan. 26: In the Last Prize they report a big strike. The First Chance is under steady work by the owners, Beach and Taft. They are sinking a winze in the Tunnel. The Eureka is again under headway. Mr. Wheeler has let a contract to sink one of the shafts 50 feet deeper. The Australia shows up good metal. They are drifting into the Mountain from the bottom of the shaft which is 85 feet from the surface. The vein is 3 feet wide in mineral. The Worldbeater sends a considerable quantity of rich ore to the "Pinal Reduction Works." The Pinal Reduction Works are busy pulverizing and concentrating. Everything works well. The building around the machinery is progressing. Double adobe walls are going up fast. The foundation is of stone and the roofing will commence as soon as the walls are finished. The teams are busy hauling ore. The Speciepaying is progressing with its mill. The road from the mine to the mill is completed. A large amount of work is now going on in various mines by the owners. They are taking out ore, for what there is in it, with a view of selling or having it worked at Pinal. The Silver King artesian well is continually gaining depth under the heavy blows of the immense plunger.

BISBEE.—*Tombstone Epitaph*, Jan. 27: There is an increased activity noticeable in this part of the country such as has not existed since the earliest days of the great copper camp.

COPPER QUEEN is going on in its usual even tenor. The stopes on the 200, 300 and 400 levels are in splendid condition, easily turning out their regular amount of ore. Some little trouble is at present being encountered by the settling of the timbers on the lower levels; the ore being in such a soft formation that the tremendous weight of ore and dirt to be supported requires the heaviest of timbers, and even these in many places will have to be bulkheaded up solid with square timbers. The furnaces are doing remarkably fine work, and turning out their regular shipments of bullion.

SILVER BEAR.—This company is sinking a well near the New York mine to obtain water for the smelter, which will be erected in a short time, as soon as Mr. Brown, the manager returns from Kansas City, where he is now in company with Judge Duncan, of the New York mine.

GALENA.—Work is being vigorously prosecuted on this mine, which is developing to the perfect satisfaction of the owners. Several tons of very fine ore have already been taken out.

BROAD GAUGE GROUP.—Work is to be resumed at once on this property. The principal amount of work will no doubt be done on the Broad Gauge mine. As that lies a little to the southeast of Holbrook, and the ore body running through the latter leads right into the Broad Gauge, there are several other properties about Bisbee on which work will doubtless soon be resumed. Some prospecting is being done in the mountains this side of Bisbee, and quite an important strike is reported in the Bunkum mine, some six miles this side of the town. The ledge is several feet in width, and the ore, which is of a free-milling character, assayed from 60 to 120 ounces silver per ton.

WEST SIDE.—*Tombstone Epitaph*, Jan. 27: The ore bodies recently found on the 500 level are developing very favorably, the ore being of a very good grade and easily mined. The stopes between the 300 and 400 levels and the 400 and 500 levels are looking remarkably well, and are turning out their usual amount of ore.

LUCKY CUSP.—This mine, which is also the property of the T. M. & M. Co., is being worked by three different shafts, and turning out a considerable

quantity of manganese ore, which is used at the furnace with other ores to very good advantage.

EMPIRE.—This mine is rapidly coming into prominence as an ore producer. A large amount of ore has already been broken from the new strike on the 200 and 300 levels, the old ore dump has been cleaned up, and the hoisting of ore from the 200 level will commence to-morrow.

HEAD CENTER.—Work was resumed in the north workings of this mine last Monday.

GRAND CENTRAL.—The pumps are still running at full capacity, and are steadily but surely gaining on the water. The stopes from the 500 level up to the 100 level are looking well, and continue to easily produce the daily output of 85 tons. This keeps the mill running at its full capacity; and there is ore enough now in sight to keep it running for many months to come without further developments.

RAILLENSAKE.—The company's mill at Water-vale has been shut down for a few days, but will start again on the first of February. Meantime prospect work is being pushed at the mine. During the past week fine ore bodies have been discovered in the Bunker Hill ground, adjoining the Mammoth's.

COLORADO.

IMPORTANT CONSOLIDATION.—*Georgetown Courier*, Jan. 26: The filing for record on Monday of certain conveyances completed a mining consolidation on which our reporter has had his eye for many months. It is no less than the transfer of the valuable properties of the Silver Plume Consolidated Mining Company, on Republican and Sherman mountains, to the Consolidated Pay Rock Company, which taken has, under Superintendent Egan's management, been steadily extending its work of development and output for several years. The successful completion of the Pay Rock Concentrator last Summer provided a means of utilizing the vast reserves of the company's low grade ores, and it only remained to effect the present consolidation to secure for this company undisputed possession of a group of the most valuable and extensive lodes in this end of Clear Creek county. To Superintendent Egan's quiet negotiations for 18 months past, is due the attainment of this end. The two companies were involved in expensive law suits over the territory now deeded, the issue of which no man could foresee any more than could he anticipated the new and embarrassing complications likely to ensue. Last Summer Messrs. Havelman, Platt and Washburn, Boston and New York capitalists, and large Pay Rock stockholders, visited the mines, grasped the situation, and energetically adopted Mr. Egan's scheme of consolidation, which was also actively pushed by State Geologist Foster, Superintendent of the Silver Plume Co. By this the Silver Plume Company conveys to the Pay Rock Company, the Silver Star, Bernice, Silver Plume, Hopewell, Hickman and College lodes; the litigation between the Hopewell and Hickman lodes, on the Plume side, and the Santry and Zouave, on the Pay Rock, is ended, and the title of the latter company secured beyond all future assault, the patent to the last named lodes now going through in regular course. As a consequence, active and extensive development has been resumed, which must soon result in large and rich mineral exposures.

WORK.—*Georgetown Courier*, Jan. 24: Allen Bros. commenced work on the old drift of the Cataract lode last Monday. They have struck a splendid streak of ore in the stope, which assays 384 ozs. per ton. John Conway & Co., lessees on the Little Emma, on Democrat mountain, brought down over four tons of ore this week, which ran 551 ozs. silver per ton, all in one class. This is the result of one month's work. Geo. A. Cole brought down 132 sacks of ore from the Bismarck Tuesday. There is a streak of ore in the stope varying from 2 to 6 inches in width. There is quite a good showing in the heading of the No. 3 adit. About 60 men are employed on the 730 mine. Seven drifts are now being run, six of which are in mineral. There are two miles of drifts and winzes in the mine. About 1317 feet of drifting was done last year. More powerful machinery will soon be added. Dean Bros., lessees on the Alabama, on Leavenworth mountain, struck a 6-inch streak, which will probably assay 2,000 ozs. silver per ton. We were shown a specimen of the ore, which is sulphurets and gray copper, and it is as fine as we have seen for many a day. Mr. Frank Hartzell, Superintendent of the Moline Tunnel Company informs us that the company has decided to push their tunnel ahead, regardless of every other matter. There is a belt of rich lodes ahead of them, and they realize that their interests lie in opening them at a great depth. Work will be resumed about the first of next month. Sometime during the spring, an air compressor and another Ingersoll drill will be put in operation. The tunnel is now in 600 feet.

IDAHO.

EXTENSIVE.—*Ketchum Keystone*, Jan. 24: The mines of East Fork of Wood river supply sufficient traffic to Wood river towns to keep that vicinity accessible by a well packed sleigh road. Mining operations hereabouts are three times more extensive than during the winter of '82 and '83. Then winter work was a thing unapproached, and there were scarcely any teams retained for hauling after the first snows. Now the Ontario, Elkhorn, Parker, and several other properties carry on their usual summer work, and employ teams steadily to and from the smelters. Two four-horse teams fly between the Elkhorn and the smelters on second-class ore, hauling as much as 2,000 to the animal at each trip. The Parker lode has become one of the best mines in the Elkhorn vicinity, and is doing more solid work than at any time previous. The ore is abundant and high grade. Ten tons were recently sold to the Bailey Sampling works for a net cash price of \$2,300. The result of two men's labor in the past thirty days has been fifty tons of this quality of ore, and the proprietors are now shipping the same to the sampling works. There are four teams hauling from the mine steadily.

DOWN FROM THE PARKER BONANZA.—*Wood River Times*, Jan. 23: E. H. Terry, one of the owners of the Parker bonanza, came down from Ketchum to-day. He says that besides the 50 tons of ore which is being shipped from the mine just now, there is at least fully as much more in sight, and there is only a hole on the ledge so far. Mr.

Gillenwater recently sold a fourth-interest for \$15,000 cash, and there is a standing offer of as much more for another fourth, but none of the owners want to sell.

THE RISING SUN.—*Wood River Times*, Jan. 23: The Rising Sun mine, of Bullion, has just been sold to G. D. Mackey, and other New York capitalists. The price paid is \$15,000 cash, and about one-half of the capital stock of the new company. The former owners of the Rising Sun were Michael Hynes, who owned three-fifths, and Dr. S. B. Miller, who owned two-fifths. The money to pay for the mine came yesterday, and the new company will begin work at an early day, with Mr. S. B. Miller as manager. The Rising Sun mine is situated in the Bullion mineral belt, and is believed to be a very promising mine.

NEW MEXICO.

THE SMELTER.—*Rio Grande Republican*, Jan. 26: The Smelter started up on Tuesday. The run was intended to be a trial one, and was, to a certain extent, a success. The galena smelter was started first, on ore from the Crescent City, and in due time a run of bullion was made. The copper smelter was then started up, also on galena ore, but the blower which did pretty well for one furnace, was not strong enough for two, and the metal soon froze up. The galena smelter made a good record, and would probably be running yet, but that the pipe which admitted cold water to the water jacket was too low down, and the cold water chilled the metal. It is now raised, and on Monday night the galena smelter was fired up again; the copper smelter being allowed to lie idle. The successful running of the smelter, which now seems to be placed beyond question, with the exception perhaps of a few trifling alternations or changes from time to time as experience may point out, has put everybody in Organ in good spirits, no one now has any doubts as to the grand future before the camp, and that too in a very short space of time. Unless something very unexpected happens, next summer will see Organ a camp second only to Lake valley. The number of buildings going up, and the amount of business being prepared for, is evidence at least that the men who have money to spend are convinced that there is a bright future before us. We do not say this to induce store-keepers and whisky-sellers to flock into Organ. We have enough of them here now. But there will soon be a demand for miners and laborers that will give employment to all who may come.

ORE.—*Silver City Enterprise*, Jan. 25: The last of nineteen cars of high-grade ore and concentrates was shipped Wednesday by M. W. Bremen to the Socorro smelter. The output from this property will make a splendid showing this year as it did last. Wolcott & Mills departed for Denning Wednesday, from whence they will take a carriage for Tres Hermanas to examine the new strike of lead carbonates made by one Carter, and in which they are interested. The strike is said to be the best yet made in Tres Hermanas district. A one-eighth interest in the Pennsylvania mine in Steeple Rock district was purchased by Nate Scarritt and John A. Moore on Saturday, of Doc Kane. The price paid was \$350. The claim is one of great prominence and we learn that work will shortly be commenced upon it on an extensive scale. A large body of water has been struck in the Bonny Jean mine, at Shakspeare, at a depth of 300 feet, and the Superintendent, Mr. Allan McLane, has gone to St. Louis to purchase pumping machinery for the mine. Aside from the recent floods of water, the mine is looking well. From the Yellow Jacket mine, an extension of the Cincinnati, in Tres Hermanas district, two car-loads of ore that sampled eighty ounces per ton were shipped this week. This camp promises to make a fine production of bullion during the present year.

THE SOLID SILVER company has received returns from 6200 pounds of Black Hawk ore, shipped some time since. 840 pounds of this shipment was native silver, which flattened on going through the stamps and came out in solid chunks, which averaged 80 per cent. pure silver. The balance of the shipment, 5360 pounds, netted \$19,343. The Colorado smeltering people say that it is the richest ore they have ever treated.

OREGON.

ITEMS.—*Jacksonville Times*, Jan. 26: Rough weather for miners. Several persons in this section prospecting for quartz. Isaac Skeeters is pipping night and day on Hogue Hill, Josephine county. Piping is going on in the Steamboat district, notwithstanding the frosty weather. Little snow is in the mountains now, the warm weather of the past fortnight having melted it off. A prospector employed by Fuller & McNulty, has discovered on the Siskiyou what promises to be a good quartz ledge. There is said to be plenty of free gold in the rock. The miners of Josephine county are all busy. There are as many as five giants at work in a circle of two and a half miles. Several old miners are coming back to the mines, there to hunt old claims they worked several years ago.

UTAH.

NEW SANOSTONE DISTRICT.—*Salida News*, Jan. 22: Mr. George H. Harlow, returned last night from a visit to his mines at the Lower Crossing of the Denver & Rio Grande, in Utah. He says the excitement is intense over the recent discoveries, and that the people are rushing in from all sections. A new town has been laid out, named "Summerville," and lots are selling fast. The mineral belt is 15 miles in length with ore that gives assay returns of 30 per cent copper and 63 ounces in silver. Mr. Harlow has three valuable claims located in the best part of the district, on which he has a force of men at work. He is also interested with Messrs. H. Sherwood, C. P. Crozer, and I. E. Arnold, in ten claims in one group, located by Mr. Arnold on a recent trip to that section, as an expert. Mr. Harlow examined these properties and expresses himself as greatly pleased with their location and the surface indications. Considerable work in development on all these claims will be done this season. Information was received in Salt Lake yesterday that a company had been formed in Chicago for the purpose of developing a group of ten mines recently purchased in this district, and that work would begin immediately.

For Mining Shareholders' Directory, Stock Reports etc., see page 97.

The Big Drum Lummon Mine.

A reporter of the *Helena Independent* has interviewed Mr. George Attwood, general manager of the Drum Lummon works and mine, now known as the "Montana Company Limited," and elicited from him much interesting information. Mr. Attwood is a gentleman of very pleasing manners, frank and courteous, and seemed disposed to give all information concerning the valuable property in his charge that would be of interest to the general public. From him we learned that the five-stamp mill of Mr. Cruse's has been increased to ten stamps, and is now running regularly, crushing about ten tons of ore per day. The product from this little mill is some \$15,000 per month in gold and silver, the gold comprising over 50 per cent.

Mr. Attwood also informed us that he has about four hundred men employed in erecting the mining machinery and building the new mill, which he expects to get into running order within the next two months. The mining machinery will be in operation inside of two weeks. The power of the mill—300-horse power—will be sufficient to run fifty stamps; but only twenty stamps will be started at first. Thirty more, however, will be added immediately afterwards, and Mr. Attwood estimates that the whole will be in operation within the next three or four months at furthest.

The capacity of the twenty stamps soon to be running will be forty tons per day—two tons to the stamp—and when the mill is completed it will crush 100 tons per day, or 110 tons per day including the product of the ten-stamp mill now in operation.

The ore crushed has averaged in gold and silver to the ton about \$75, so that the daily yield of the 110 tons crushed will be over \$8,000 per day, or \$2,880,000 for 360 days.

The Outlook of the Mine

Was never better than now. The lead, 80 feet wide, has no waste rock, and, as stated, averages \$75 per ton as it comes from the mine. Mr. Attwood has caused a shaft to be sunk fifty feet in depth in the lowest level of Mr. Cruse, and finds that the ore is richer at that depth than above. This is exceedingly encouraging and naturally leads to most sanguine anticipations of what will be struck in the lowest level, now being pushed rapidly to completion. This level has now been driven into the mountain 900 feet, and is steadily advancing through solid rock at the rate of 120 feet per month. It is wide enough for a double track and seven feet high, exclusive of the timbers, water way, etc. Mr. Attwood confidently anticipates that he will strike the lead and unearth its vast treasures within the next sixty days.

This level or tunnel has been called the Maskelyne Tunnel, in compliment to the President of the company, the Hon. Nevil Story Maskelyne, who is a member of the British Parliament.

At the mouth of the tunnel Mr. Attwood has erected the most

Complete and Extensive Mining Works. To be found in the West. It consists of boilers and engine with 200-horse power, which will be utilized for driving the stopping drills in the upper tunnel, including the mine pump, hoisting machinery and ventilating fans, as well as for driving the drills in the deep tunnel and ventilating the same.

Among other improvements should also be mentioned a tramway to carry the reserves of ore from above the Cruse tunnel to the new mill. This is a substantial inclined way traversed by iron cars, and having a capacity of two tons to the car. At each end of the tramway are ore bins having a capacity of thirty tons each.

We learned also from Mr. Attwood that his mine plant consists, in addition, of a sawmill driven by a 15-horse power vertical engine; also a large lathe driven by a 10-horse power vertical engine; also a planing machine, bolt and pipe cutter, blacksmith forges, etc., all inclosed in a massive building 107 feet long, 61 feet wide, and 44 feet high. The machinery will be utilized not only in the construction of the works, but in keeping them afterwards in repair.

It is difficult at this time to estimate the immense value to Helena and Montana of this mine. Mr. Attwood thinks that from

Four to Five Hundred Men

Will be kept constantly employed by this company in the mine and mills, and as many more will incidentally find employment in various industries produced by the enterprise, such as cutting and hauling wood, burning charcoal, etc., etc. The average wages paid by the company are \$3.00 per day to its employees, and those finding incidental employment will doubtless realize as much—making a grand total of about \$3,000 per day which will go into the hands of laboring men, and from them pass into the various avenues of trade. This equivalent to \$1,100,000 a year for labor alone, saying nothing about the large amounts which will be expended in other ways by the company. Assuming that the lower tunnel finds the vein of the same richness and width as above, of which there is but little doubt, it will develop a block of ore 250 feet high and 80 feet wide. The mine has been prospected by drifts along the vein to a distance of 800 feet, and assuming that this is all there is of it, we obtain the number of cubic feet by multiplying the height, width and length together. Thus 250x80x500 equals 16,000,000 cubic feet. Twelve solid cubic feet of ore represents a ton, and dividing the 16,000,000 cu-

bic feet by twelve, we have 1,333,333 tons of ore above the lower level. Estimating that 100 tons of ore are crushed per day, we have say 36,000 tons per year, and at this rate it would require 38 years to crush the ore in sight above the lower level, to say nothing about the balance of the lead! Our readers may set it down as a fixed fact that if the lower tunnel finds the lead as good as above, the Drum Lummon is the greatest mine in the world. Helena has reason to congratulate herself upon its close proximity. The Wickes cluster of bonanzas and the Drum Lummon lead, would alone support a city of 10,000 inhabitants, saying nothing about our other resources.

Talk About Copper.

The history of copper mining in the United States during the past year is full of interest. The product of the Butte mines, says the *Inter-Mountain*, seems to have upset the calculations of the copper sharps, and the estimates made in '82 for the ensuing year have proved to be far out of the way. In our sister Territory of Arizona the effect of the Butte production has been most seriously felt, but the high prices which prevailed during the early part of the year sufficed to make the Arizona output much larger than it is likely to be for '84. That one mining region is made to prosper at the expense of another is to be deplored. Arizona has some magnificent copper properties. The ore, though carrying a less proportion of copper than that of the Butte mines, is much more easily extracted and reduced, being for the most part a carbonate and above water level; but it carries no silver, and the policy of the Atchison, Topeka & Santa Fe and the Southern Pacific Railroads is so extortionate that at the present ruling prices the copper mines cannot be worked to any degree of profit. Only one mine in the Territory—the Copper Queen—is able to make any sort of a fight against present antagonistic conditions.

The Butte mines have been continuously and successfully worked. When the market was glutted and Pope, Cole & Co. refused to purchase any further supply of ore and matte on account of inadequate facilities for separation, the Butte companies, with the exception of the Parrott, which largely consumes its own product in an Eastern factory, began shipping to Swansea, where a ready market was found at fairly remunerative prices, the Butte producers entering into active selling competition with those of Chili and Spain. One reason of this was the high percentage of copper contained in the Butte ores and matte, and the fact that they contained a large amount of silver, which greatly assisted in meeting the extra expenses of transportation. The silver value of the Butte copper exports may always be relied upon to furnish an important element of strength in competing with foreign producers of exclusively copper ores. The future of the copper industry of Butte may therefore be confidently stated to be exceedingly bright, with ample assurance of its so remaining.

In the American market the Lake Superior mines are Butte's only formidable competitors; but as the Lake product and the Butte product enter into different uses to a large extent it is reasonably certain that even if the foreign demand should decline, which it is not likely to do, the increasing consumption in this country may be depended upon to create a steady market for much more of the Butte product than is now sold in this country. Another reason for this belief is that many of the Arizona mines which have been largely contributing to the home demand will have to remain closed down.

In this connection the following review of the upper market for the year '83 and estimates of production, though somewhat inaccurate as to Arizona, may be of interest. It is taken from the circular of Mathews & Webb, samplers and ore buyers, of Denver.

Copper—The year opened with a very quiet but firm market, at 18 cents for Lake and 17 cents for less favorite brands at New York, but within two weeks the first large pool sale was made, being about 12,000,000 pounds at 18 cents, mostly to consumers at and for deliveries along over the first four months of the year. The Lake companies had agreed to sell for no less price over the time of deliveries, but from the day of the sale on the price was never any higher, and gradually sagged off, reaching 17½ cents by the middle of March, with a very general feeling that a break was inevitable. Early in April about 50,000 tons were sold for export, and immediately thereafter the price of Lake dropped to 16 cents, and even 15½ cents, at which prices, in varying firmness and weakness, the market drifted along until the early part of June, when it became evident that the various outside brands, such as Baltimore, Arizona, etc., were accumulating. Another export movement was freely talked of, but none occurred, and the demand increased so as to fairly absorb the supplies. Prices, however, continued to weaken slowly, from 15½ cents in July down to 15 cents until early in September, when the decline was checked and a trifling advance established and maintained until the middle of October, when a pool sale of some 8,000,000 pounds to manufacturers and dealers, at 15 cents, was made. From that time to the close of the year the price has ruled very steadily at and about 15 cents for Lake, and 14 cents to 14½ cents for the outside brands, and closes with the general

impression that copper is very near the cost of production.

The year's production is set down by the most competent authorities as follows:

	Pounds.
Arizona	35,000,000
Montana	38,000,000
Utah, Colorado, etc.	5,000,000
	78,000,000
The Lake regions	65,000,000
Total	143,000,000
Exports have been	26,000,000
Left for home use	117,000,000

Sonora Mines.

G. E. B. Durand has been interviewed by the *Eureka Sentinel*, and describes that portion of Sonora which is near the Chihuahua line and on which the Sierra Madre mountains are, as God's own country. He says the climate is delightful all the year round. Nature has done everything besides to make the region charming and attractive. The soil is rich, and almost everything grows luxuriantly and without much care. In the driest season of the year, streams brimming over with cold, clear, pure water abound, along the borders of which peach trees and watermelon patches, wherever there is a ranch, delight the eye and produce luscious fruits. The scenery is magnificent. He says: "If I should take you up on one of the summits of the Sierra Madre, and give you a good glass to look at the surrounding country with, it would excite you. You wouldn't be able hardly to talk about what you saw. That's the way the scenery affected me."

"As for mining, it is by all odds the richest section I know anything about, especially in copper ores, although I speak mainly with reference to the silver mines. I saw a specimen of ore that went \$1,000 in silver, and carried by actual assay 50 per cent of copper. You can travel about in a thousand gulches and pick up float rock, free milling, that will go from \$30 to \$40 per ton."

The Drawback.

"If miners could work in Sonora as they can in the United States, you would not see me here. The fact is, there you never can feel that either your property or your life is safe. Few prospectors can stand the expense involved in securing a title from the Mexican government, and even then you are subjected to annoyances, and, strange as it may seem to you, who are familiar with the sacredness of such a title in this country, you are liable to lose it. The way that you come nearest being safe in your possession is to have a native Mexican in with you as a co-owner. Then, ordinarily, you are secure as regards your patent rights. There are a few instances in which foreigners get along and make bullion out of the Sonora mines hand over fist. Near the place I mined there were two young Americans who struck a mine from which they have, with their own hands, been taking out between \$30,000 and \$40,000 per month for two years. But they have been very lucky in escaping the Indians, who are likely to shoot them through the head any day."

A NEW MINING DISTRICT.—Yesterday a gentleman by the name of Robert Waugh, from Eastern Iowa, who has been spending several months in the districts of Nevada, called at the *Tribune* office and exhibited some fine specimens of ore from Snively Mining District. This district was discovered late last October, and is eligibly situated three miles due south of Lory station on the Central Pacific Railway, about 16 miles west of Pilot Peak and 7 miles east of Toano. Some development work has been done on four locations, improving at depth. In one shaft 20 feet deep, 3 feet of excellent ore is exposed. This ore has been assayed in Salt Lake by McVicker and others, and runs from 39 to 2,100 ounces silver. Samples have been submitted to Prof. Clayton, who pronounces them fine. A full line will be sent to the Mining Institute, to show the world that Nevada has not lost its grip as great mineral producer. A. P. Snively, the discoverer of the district, is an old and experienced miner. He thinks he has one of the best districts ever found in Nevada, and is desirous that Salt Lake men visit it and examine for themselves. It is tributary to this city, and the development of the mines will not only enrich those who are first in the field, but will materially aid Salt Lake in retaining its position as the great mining center of the Rockies. —*Salt Lake Tribune*.

GOLD.—Snake river produces something better than fine gold in bottoms and shoals. Fifteen miles below the mouth of Dennet creek, near the mouth of Sturgis creek, there is a placer mining claim that is a good witness for itself. C. M. Keets, now of Mineral district, a practical assayer and miner, has shown evidence of the wealth of that stream by specimens of coarse gold that remind one of the mountains. They were taken from a claim owned by Wm. Tobin. Last fall, within a few weeks, \$1,500 was taken out of the claim—from a bar on the edge of Snake river. A half interest in the claim was then sold for \$1,000, and shortly afterwards two men washed out \$3,000 gold dust. They expect to take out \$6,000 next season. This claim is on the Idaho side of Snake river on the bar of the mineral belt extending across that portion of this county. —*Weiser Leader*.

The Colorado Mine Disaster.

A dispatch from Denver, Col., January 24th, says: "The explosion in the Crested Buttes coal mine this morning was one of the most appalling that ever occurred in a coal mine in this country. Crested Buttes, near which the mine is located, is a coal mining town thirty miles north of Gunnison City, on the Denver and Rio Grande Railroad. The explosion occurred either in chamber 1 or 2, just half an hour after the day force of sixty-seven men had gone to work. There were ten men at work in chamber 4, and these escaped unhurt, except one man, John Angus, who was in the passageway just outside the chamber. He is badly burned, but will recover. Fifty-seven men were at work in chambers 1 and 2. These, it is thought, have all perished. The explosion was of such force as to completely barricade the main entrance, and appliances for supplying air located near were badly wrecked and the roof of the tramway blown off. The men at work on the Anthracite Mesa mine, the night force of the Colorado Coal and Iron Company's mine, and citizens generally were working hard all day to rescue the men, although it is thought none can possibly escape alive. The Towu Hall has been prepared for the reception of the dead. As soon as possible the fan was repaired and put to work pumping air into the mine, and men were set to work to remove the obstructions so as to reach the chambers and get the bodies out to-night if possible."

Names of the Killed.

The following are the names of fifty-five of the unfortunate; the other two are unobtainable: Henry Anderson, John Williams, M. T. Stewart, John Martin, Thomas Rogers, Joseph O'Neil, Jacob Laux, John Anderson, James Walsh, Peter Baker, William Davidson, Richard James, David Hughes, P. McManus, W. L. King, John Creelman, John Hular, Thomas Williams, John Shan, Patrick Barrett, John McGregor, John Myers, F. W. Smith, G. B. McHelson, William Maroney, Nick Proist, Thomas Lailey, John Prince, James Driscoll, James Coughlin, Henry Stewart, B. Heffron, L. P. Heffron, W. L. Jones, John Donnelly, Carl Rodemauld, Charles Sterling, Thomas Roberts, James McCourt, Fred. Becht, Iker King, Joseph Weisenberl, H. Donegan, Joseph Krause, James F. Stewart, Jr., William Neath, Thomas Glancy, John Rutherford, William McCowitt, A. M. Godfrey, Daniel McDonald, William Aubrey, Benjamin Jeffries, Morgan Neath and Thos. Stewart.

Many of these are married and leave families, some of whom are living here.

Scenes at the Mine.

At this hour everything is in such confusion it is impossible to give details. A special train left Gunnison City at 2 o'clock this afternoon with surgeons and a large number of citizens to render all the aid possible. The town of Crested Buttes is in mourning, and crowds of women and children are about the entrance of the mine praying, wringing their hands and crying piteously, presenting a scene most heartrending. It is said that at the time of the explosion there were ten kegs of black powder in chambers 1 and 2, where the men were working and where the explosion is supposed to have taken place. The mine has three miles of drifting, and so it is impossible to definitely locate the accident until the rescuing parties gain admittance.

A Rich but Dangerous Mine.

The mine has long been considered dangerous by those acquainted with it. While one of the best producing mines in the country, its operation has always been attended with more or less apprehension and real danger. "It is a fire-damp mine," said Superintendent Cameron, now in Denver, "and there seems to be a constant drain of the most deadly gases; they seem to generate in the coal or under, and pour out in the seams of the walls, in the tunnels or shafts, yet the mine is one of the most perfectly ventilated in the world. Air is forced in along the shaft by machinery; no less than 56,000 cubic feet of fresh air is forced into the mine every minute. This is quite sufficient to supply the wants of the miners and keep the air perfectly pure unless some accident happens to cut off or interfere with the supply. This is a greater amount of fresh air than is furnished to any other mine in this country." Superintendent Cameron added: "We send a mine-viewer through every chamber each day before the workmen are allowed to go in. He must have returned this morning before the men started in, and everything must have been all right when he passed through the workings."

DR. DURAND says that the southern portion of Arizona is dull, but not more so than he finds Nevada to be. The mines there are mostly in lime formation, and easily worked. But little use is made of powder, and the expense of extracting ore with pick and shovel is so slight that \$15 ore in many places can be taken out with a profit. The country has been overdone, and a good many people who were induced to migrate thither on account of the stories of fabulously rich mines in the Tombstone and Tucson districts have gone out disgusted because they did not realize their expectations of immediate fortune. The reaction that resulted has put mining under a cloud.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication to the Mining and Scientific Press by HENRY C. HUNTS, State Mineralogist.]

- LIST OF CONTRIBUTIONS.**
- 5136 Stone Pencil of Mica Schist, California. D. C. Stone.
 - 5137 Stone Pencil of Mica Schist, California. D. C. Stone.
 - 5138 Stone Pencil of Mica Schist, California. D. C. Stone.
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Strontia.

Occurrences.

The strontia minerals have been identified at many points in the United States, and probably occur more frequently than is generally supposed, as systematic search for them has not been prosecuted to any extent. Strontianite (strontium carbonate) has been found at Schoharie, New York, in hydraulic limestone; at Muscalonge lake, New York; at Chaumont bay and Theresa, Jefferson county, New York; and in Millin county, Pennsylvania. Celestite or celestine (strontium sulphate) occurs at Green or Strout's island and North Bass island, Lake Erie, where it occurs in magnesium limestone of the Water-lime group, at the former locality being found in large masses of beautiful crystals; and at Chaumont Bay, Schoharie, Lockport, the Rossie lead mines, Depauville, and Starr, in the State of New York, and also at Bell's Mills, Blair county, Pennsylvania. The blue fibrous variety found in Pennsylvania is the celestite originally taken to Europe by Schutz and named by Werner.

Small lots of American strontia have been offered in the market from time to time, but have not always met with a ready sale.

Uses.

Nitrate of strontia is used in this country to a considerable extent by the makers of fireworks. It is made here by the chemical manufacturing works from imported carbonate.

An increased demand has recently sprung up in Europe, owing to the introduction of a new and successful process for treating beet sugar, which promises to absorb large quantities of strontia in comparison with the former consumption. Strontia has also been recently utilized in the manufacture of tuncres for blast furnaces. These new applications will undoubtedly lead to active prospecting for and mining of strontia minerals, and will tend to develop localities which heretofore have not been productive.

The amount of celestine mined in Sicily, the principal source of this mineral, is reported to have been about 4,000 gross tons in 1881.

DRIFT OR NOT DRIFT.—There are various opinions as to whether the mines that have been worked by hydraulic methods will hereafter be drifted. There is one question, the answer to which will surely determine the matter. That question is: "Will it pay?" Those mines the drifting of which will pay, will be drifted; such as will not pay to drift, will not be drifted. In the course of time all will be drifted, for in the course of time drifting all of them will pay. Any business that will pay will be followed; any business that will not pay cannot be followed for any great length of time. Mining is just like any other legitimate business, and it stands on no exceptional business principles. And because this is true is why we know that many mines around Grass Valley, that are now idle but have been worked in the past, will again be worked. The Allison Ranch, North Star and many other mines here will be again opened in time, and that because they will pay when worked in improved ways and with economical appliances. We have not a doubt but that mining will be successfully followed until the time the earth becomes as dead as the moon now is, which direful event will not happen for some millions of years yet to come.—*Foothill Tidings*.

USEFUL INFORMATION.

Queer Freak of Watches.

"Decidedly watches are queer things," said H. H. Hopkinson, of the *Jewelers' Circular*, seated in the easy chair of his editorial sanctuaries. "They possess some unaccountable peculiarities. For instance, some time about the beginning of last summer, when there had been a succession of fine displays of the aurora borealis, it was estimated that in a single night in the city of New York the main springs of not less than three thousand watches broke. This estimate is based on actual inquiries. Fine sensitive watches are particularly liable to be affected by electrical atmospheric disturbances. During the months of June, July and August, when these phenomena are most frequent, there are more mainsprings broken than during all the remaining months of the year. They break in a variety of ways, sometimes snapping into as many as twenty-seven pieces.

"It is a fact that since the introduction of the electric light has become so general a large number of watches, some of them very fine ones, have become magnetized. While in this condition they are useless as timekeepers. This defect should be considered incurable, and because of it thousands of watches have been thrown away after much money had been spent on them in vain attempts to persuade them to keep good time. Among the methods resorted to were washing the parts in garlic juice, refining and passing them through the fire. But all these devices were entire failures or only in part effective.

"I know of a man who had a fine and valuable movement which kept excellent time. He transferred it from a silver case to a second-hand gold one. Immediately it lost all of its characteristics of steadiness and reliability, and, in fact, did not keep time at all. When replaced in the silver case it kept good time again. The owner, a jeweler, puzzled himself, and experimented in vain to discover the cause of this strange partiality on the part of his watch for silver. At length he sent it to an expert. He discovered that the lifting-spring of the gold case had become magnetized. On substituting another for it, the watch kept as good time in the gold case as in the silver case.

"There are occasions when it is a very serious matter to have your watch magnetized. The most striking instance in point is one which lately came under my notice. Captain W. R. Smith commands the steamer *Delaware*, which plies between New York and New London. Before putting to sea, on a recent voyage, he was invited to inspect an electric light dynamo machine and examined its parts closely. Soon after getting on board the steamer he observed that the compass became strangely affected when he approached it. Whether he stood on the right or the left, or immediately in front of the compass, the needle would invariably point to him. The compass was worse than useless when he came near it. It was dangerous and might wreck the ship. You can imagine that this phenomenon alarmed and puzzled Captain Smith not a little. At length he recalled his visit to the dynamo machine and the true solution of the eccentric behavior of the needle flashed upon him. His watch had become magnetized. When he removed it the needle resumed its constancy to the polar star. On his return to the city he took the watch to a watchmaker, who demagnetized it for him. This firm has invented some machine, the mechanism of which is a secret, by which they demagnetize a magnetized watch speedily and effectually. They get watches sent them from all parts of the world to be thus treated.

"Watches frequently get magnetized in iron mines or in machine shops, where they are incautiously brought near swiftly running belts. I knew a workman who used to hang his watch between the parts of a running belt. He expended a small fortune on mainsprings.

"It is a well-known fact among horologists that no watch will keep the same time with two people. The cause has not yet been definitely ascertained, but it would seem that in some mysterious way a watch is affected by the temperament of the wearer. The mere physical differences in gait and movement between different people is not sufficient to account for all the variations that have been observed."

—*New York Tribune*.

THE "DUCONG," OR VEGETARIAN WHALE.—A writer in the *Gentleman's Magazine* gives some interesting particulars relative to this species of whale, now taken to a considerable extent in Queensland, and valuable alike for its oil and as food. Its size varies from eight to twenty feet in length; it lives upon submarine meadows of seaweed; it has no gills, but breathes air by means of lungs; its head is round and somewhat human like, and has hair something like that of a man's beard. It is said many stories of merman and mermaid may be traced to these creatures. Their oil is said to have all the medicinal merits of cod-liver oil without its unpleasant flavor; at ordinary temperature it deposits crystals, as olive oil does in frosty weather, but on warming slightly becomes liquid and clear. The flesh is much prized in Australia, being cut off in fitches and slabs, and it is stated that "from the same animal is taken meat resembling beef, veal and bacon."

A SUBSTITUTE FOR MATCHES.—Countless accidents, as every one knows, arise from the use

of matches. To obtain light without employing them, and so without the danger of setting things on fire, an ingenious contrivance is now used by the watchmen of Paris in all magazines where explosive or inflammable materials are kept. Any one may easily make trial of it. Take an oblong vial of the whitest and clearest glass, and put into it a piece of phosphorus about the size of a pea. Pour some olive oil heated to the boiling point upon the phosphorus; fill the vial about one-third full, and then cork it tightly. To use this novel light, remove the cork, allow the air to enter the vial, and then re-cork it. The empty space in the vial will become luminous and the light obtained will be equal to that of a lamp. When the light grows dim, its power can be increased by taking out the cork and allowing a fresh supply of air to enter the vial. In winter it is sometimes necessary to heat the vial between the hands in order to increase the fluidity of the oil. The apparatus thus prepared may be used for six months.

SHELLAC DISSOLVED IN BORAX.—It is well known that shellac dissolves in borax solution, and this solution is often utilized for various purposes, both as varnish and cement. The following are the proportions employed: Ten parts of borax, 30 parts of coarsely pulverized shellac and 200 of water. It is dissolved by warming on a steam bath for a few hours. When cold it may be filtered. To make it more pliable, add a few drops of glycerine. It may be given various colors by introducing soluble pigments: For black, it is recommended to use soluble nigrosine; red varnishes are obtained by adding eosine or fuchsine; for blue, either methylene blue, alkali blue or marine blue; for green, use malachite green or brilliant green; and for violet, methyl violet.

SHUTTING DOORS QUIETLY.—The application of a spring or suspended weight to shutting a door makes that shutting noisy. To remedy the evil two German mechanics have invented a pneumatic device, wherein the act of opening the door moves a piston away from a suction valve, causing air to be drawn freely through the latter. As the door is closed the piston returns, and the air has to escape, but can only do so by an aperture much finer than that through which it entered; hence, a brake-like action on the door.

A GOOD CEMENT.—Persons who use brass letters on glass windows or doors are often troubled by their dropping off, from unequal expansion or from too violent efforts on the part of the window cleaners. The following is said to be a sure cement. It should be mixed just before using: Litharge, two parts; white lead, one part; boiled linseed oil, three parts; gum copal, one part.

NOT A BAD COUNTRY FOR RAILWAYS.—The Mexican Central railway runs through twenty-one cities with an aggregate population of 896,609, and eight of them are State capitals. In these cities are seven mints, whose annual coinage is not less than \$35,000,000, and the agricultural valuation of the twelve States through which it passes is something like \$110,000,000.

GOOD HEALTH.

The Origin of Physicians.

The first physicians of whom mention is made in history were those who embalmed the Patriarch Jacob (Gen. chap. 50-2), by order of Joseph, his son. They are styled the servants of Joseph, whence it appears they were not priests, for the Egyptian priests had too much honor and influence with both king and people to be the servants of any man, however exalted his station.

The Egyptians attributed the invention of this art to Thoth, or Herms, who engraved its principles in hieroglyphics upon pillars. These hieroglyphical writings were supposed to have been transcribed into books by Agathodemon, or the second Mercury, which books the priests asserted had been preserved in the sacred recesses of their temples.

But the system of medicine among the Egyptians appears to have been nothing better than a collection of absurd superstitions. The ancient Greeks, likewise, according to the picture which Homer gives of them in the *Iliad*, seem to have possessed but a very low degree of this art. Esculapius was the first person among them who had any valuable knowledge of this kind; and his knowledge, probably scanty, procured him such respect that after his decease he was deified by his countrymen. Hippocrates, who claimed the honor of being the seventeenth in descent from Esculapius, was the first who treated of medicine in a regular and rational manner. Hippocrates is supposed to have lived about 400 years before Christ. He is the most ancient author whose writings on the medical art are preserved, and is therefore styled the father of medicine. He endeavored to explain the causes of the diseases of the human frame and their symptoms, to classify them, and to point out their preventives or remedies. He laid down maxims for the preservation of the health; for the regulation of exercise and bathing. He appears to have used purgatives, emetics, venesections, sudorifics, moist and dry fomentations, gargles for the throat, oils and ointments, cata-

plasm, mixtures composed of various substances to soften tumors and disperse swellings, and various other compounded medicines. Celsus was another celebrated ancient writer on the subject of medicine. He lived in the time of the Roman Emperor Tiberius. In the reign of Adrian, A. D. 131, lived Galen, a native of Pergamus, one of the most illustrious men in the annals of medical science. After the downfall of the Roman Empire, the Arabian or Saracenic physicians became illustrious for the knowledge and practice of the art of medicine. To them Europe is indebted for the preservation of the medical science of Greece and Rome, and likewise for the description of many new diseases, and the mode of treating them. Of these Avicenna was the most famous. Their system of medicine was introduced into Europe very early with great success.

In the beginning of the sixteenth century, Paracelsus, a famous chemist, advanced a new system of medicine, founded on chemistry. In 1628, the celebrated Harvey demonstrated and communicated to the public the important discovery of the circulation of the blood. This overthrew almost all the former systems, and prepared the way for that highly improved state in which the medical art exists at present.—*Sanitary News*.

CHARCOAL AS A FOOD.—Whatever increases the power of laying on fat, or promoting the rapid and healthy production of flesh, must be food or equivalent thereto. This pure charcoal does most effectively, as recently proved by taking the live weights of two lots of sheep, and simply separating them by an ordinary net, the artificial food, corn and cake, being carefully weighed out to each lot alike daily, one pint of charcoal being added to one lot only. When re-weighed prior to selling to the butcher, the increase in weight was in favor of charcoal by 16 1/2 per cent. Sanitation causes easy and complete digestion, and assimilation only can account for these results, which charcoal alone can accomplish. The charcoal should be given mixed with the food, except in urgent cases, when it may be mixed in water or thin gruel, and given as a drench. The dose is one pint to every twenty-five head of sheep or lambs. One-quarter pint per head for full-grown cattle, horses or pigs; half the quantity for young cattle, and two teaspoonfuls to one dessert-spoonful for young calves, daily, when suffering from disease, or in ill condition. To keep in good health and fortify against diseases, the dose should be given two or three times per week according to the class of food they are having, and the state of the atmosphere. The best plan is to wet a quantity of bran, pollard, or malt combs, mix the charcoal amongst it, and then amongst the food you give them. For rapid and healthy fattening of cattle it should be used daily amongst their food. Charcoal for internal and medicinal purposes must be pure vegetable charcoal, free from all irritating and injurious foreign matter. The charcoal, when coming into the user's possession, must be kept perfectly dry and free from any ill-smelling surroundings, such as the vapors of a stable or artificial manures, etc., or it will absorb them and thus become septic, and of no medicinal value. It is better kept in a closed bin or tin canister with a closely fitting cover.—*Farm and Home*.

WHAT TO DRINK TO KEEP YOU WARM.—"If you want a drink that will keep you warm a whole night long out of doors," said an old policeman to a friend, "don't drink whisky or rum, or any liquor. The heat they afford is short lived, and leaves you cold and weak. They are worse than nothing; but drink a glass of ale and pepper—new ale and common black pepper. It will not affect your head, but it will keep your blood warm in the keenest wind and coldest rain." "I never tried the pepper part of that prescription," said a Third Avenue car driver, "but ale is, I know, thought to be very warming. We car drivers have colder work than policemen do, I think, and the old ones among us have tried every drink you ever heard of. A lot of us were talking the whole thing over the other night. Hot rum, hot whisky, brandy and ginger, and all the cold clear alcoholic drinks were discussed. But the majority were in favor of hot coffee. That is the least hurtful, the most heating, and the longest lasting drink I know of."—*New York Sun*.

TO CURE DRUNKENNESS.—A medicine for drunkenness is red Peruvian bark (*cinchona rubra*). A pound of it is powdered and soaked in diluted alcohol. It is then evaporated down to half a pint. The imbriate is given a teaspoonful of the medicine every three hours, and his tongue occasionally moistened between the doses during the first and second days. The third day the dose is generally reduced to half a spoonful, then to a quarter of a spoonful, and gradually lessened to fifteen, ten and five drops. This treatment is continued from five to fifteen days, and in bad cases to thirty days; the average is about seven days. The result is said to be a lasting dislike for liquor in any form.

The essential elements of healthy recreation, according to Sir James Paget, are "uncertainty, wonder, and the exercise of skill." It would be worth while to see how many of these elements enter into the conventional "Sunday excursions," so much praised by the popular press for their health-giving qualities.

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SAN FRANCISCO:

Saturday Morning, Feb. 2, 1884.

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Passing Events.

During the past week California has experi-
enced one of the most welcome rains possible.
The water has fallen in abundance and fallen
all over the State. The agricultural popula-
tion are hard at work, and the miners—all ex-
cept the hydraulic—rejoice too. The gravel
miners, however, are compelled to see the water
pass by without being used. The rain has re-
vived business, for the State may now look for-
ward to a prosperous year, though only a week
or so ago there was a prevailing feeling of
depression.

The principal topic of conversation among
miners just now is the expected "rush" to the
Idaho placers. Every item or news from the
Cenr d'Alene region is read with avidity. So
far there seems to be a very general belief in the
richness of the mines, though the region itself
is not by any means attractive. Men are start-
ing every day for the mines, notwithstanding the
great expense entailed and the hardships of
travel. Moreover, little can be done there at
present. The snow is four or five feet deep
the weather very cold, and no chance for any
work to be done.

The developments made in some of the
Tombstone mines during the last two weeks
are encouraging in the extreme. Ore bodies
have been discovered in several of the mines
that have been lying idle for months, and in
several cases these ore bodies promise to be
rich and extensive. Development work is be-
ing vigorously prosecuted in all directions with
the most favorable results.

California's Mineral Resources.

Many people imagine that California's posi-
tion as a mining region depends entirely on her
gold product, for which she has been famous
since mining was commenced here. There are
many other minerals, properly designated as
economic minerals, which exist in California in
more or less abundance. Coal, iron, salt and
clay are the foundations of many manufactures.
The last three mentioned are found here in
abundance, and coal suitable for most purposes
is also found here.

If the economic minerals found in California
cannot be made immediately available it does
follow that they are less valuable. It is too
often the case that those finding deposits of min-
erals regard them only as a source of immediate
profit; and if they cannot be made available at
the moment are considered comparatively
worthless. A list of the most important econ-
omical minerals has been made out by State
Mineralogist Hanks, and we give here those
that have been found in this State.

Of building materials there are the following:
Alabaster, asphaltum, agalmatolite (or figure
stone), broken stone (for rubble, pavements,
etc.), basalt, bitumen, cement stone, diorite,
fire-stone, diatomaceous earth, feldspar, gneiss,
greenstone, gypsum, hydraulic limestone, indur-
ated volcanic ash, lava, limestones, marbles,
sand, sandstone, schist, serpentine and slate.

Of clays there are blue clay, brick clay, fire
clay, Kaolin (or porcelain) clay and terra-cotta
clay.

Of fuels there are bituminous shale, coal, lig-
nite, peat and petroleum.

Of mineral manures we have coal slack (or
dust), gypsum, nitrate of soda and other.

Of gems and semi-precious stones there are
the following: Bloodstone, cat's-eye, chalcedony
diamond, jasper, j-t, malachite, onyx and
opals.

Then there are found in California ores and
minerals containing antimony, arsenic, bismuth,
cobalt, copper, chromium, iodine, iron, iri-
dium, lead, lithium, manganese, mercury,
molybdenum, nickel, palladium, platinum, soda,
tellurium, tin, tungsten, vanadium and zinc.

Among other economic mineral productions
of the State are alum, asbestos, boracic acid,
horax, hurr millstone, chromic iron, feldspar,
glauberite, graphite, Iceland spar, lithographic
stone, pumice stone, pyrites, quartz, red chalk,
salt, sulphur and therandite. Most of our atten-
tion has, of course, been paid to gold mining.
But we produce considerable coal, iron, quick-
silver, chrome, copper—in fact, a number of
mineral substances in abundance—and these econ-
omic minerals are good, permanent sources of
wealth. As the country is more densely popu-
lated many branches of mining not now profit-
able will become so.

Safety Devices.

Here among us the compartment shaft system
has long been recognized as the best, the single
shaft, or rather single compartment shaft, being
confined to shallow mines. On the continent
in the big coal mines the custom of reserving
one shaft exclusively to the use of drawing
coals is gaining favor. In such a case a second
shaft, called the *puits de service*, is set apart for
the men and for lowering materials into the
mine. Where possible a third shaft is used as an
upcast for the ventilation. With an arrange-
ment of this nature, the drawing cages may be
constructed suitably to the one kind of work
required of them, and it is, therefore, the prac-
tice to design them differently in some respects
to gain comfort and safety. The cage of the
puits de service is alone provided with safety
catches, when these are used at all. Mr. Andre,
the mining engineer, reports having observed
one of these devices not long ago, which was
constructed to grip a wire rope fixed for the
purpose instead of the guides. The wire was
secured at the bottom of the shaft to a balk of
timber, and at surface was passed over pulleys
and connected with a series of weights resting
upon a platform. In the case of the cage break-
ing away, a set of cams attached to it grip the
wire rope, and, as the cage descends, the
weights are lifted one after another. The
object of this arrangement is to bring the cage
to rest gradually, and so to avoid the sudden
and dangerous shock which results from the
catches gripping a fixed support. Some trials
lately made to test the efficiency of these safety
devices showed there action to be very satis-
factory. The practice, common on the conti-
nent, of lowering into the mine the materials
required for packing, occasions a great deal of
work in the *puits de service* in the intervals
between the raising or lowering of the men.
From the quarry whence the materials are
obtained to the shaft, the transport of the tubs
is effected by mechanical haulage, usually by
the method of the endless rope.

Increase of Cost with Depth.

The cost of drilling deep holes with the dia-
mond drill in rocks of moderate hardness is cer-
tainly much greater than by the rope drilling
process, as practiced in the Pennsylvania oil
regions, and the progress made is also much
slower. The cores obtained may or may not be
worth the differences in time and money. When
a large number of comparatively shallow
holes are to be drilled in hard rocks, or pros-
pecting holes are needed from some point in-
side a mine, or where inclined or horizontal holes
are required, the diamond drill gives the best
results. When a large number of holes of mod-
erate depth are drilled by a corporation owning
and operating the drill the cost per foot may,
by proper arrangement, be much reduced.

Mr. Lewis A. Riley, in Vol. V, page 306, of the
Transactions of the American Institute of Min-
ing Engineers, reports the average cost of 24
bore holes (ranging from 100 to 900 feet in
pepth), aggregating 9,902 feet, at \$2.22 per
foot. Their average depth was about 400 feet.
The average progress made in 10 hours was 18.9
feet. This estimate of \$2.22 cents per foot
covers everything except royalty, interest or in-
vestment, and wear and tear, for which 20 or
30 cents should be added.

For holes double this average depth the
cost per foot would probably be nearly, if not
quite, doubled. Mr. Riley divides the cost thus:

Labor.....	\$1.15
Diamonds.....	.66
Fuel, Water and Repairs.....	.41
	\$2.22

The figures given by Mr. O. J. Heinrich in
volume 2, page 241 of the transactions of the
American Institute of Mining Engineers, show
how rapidly the work of drilling by this
method measures with the depth. The boring
was done at the Mithothian collieries in
Virginia.

Depth of Hole.	Cost per foot including Interest.
419 feet.....	\$1.86
850 feet 3 inches.....	2.43
1142 feet.....	3.62

The estimates were based on the following
scale of wages for a twelve-hour shift:

Skilled Labor (foreman, etc.).....	\$2.50 per day
Engineers.....	2.00 "
Assistants.....	\$1.50 to 2.00 "
Laborers.....	1.00 "

The cost of the drilling for labor per foot
was:

For 419-foot hole.....	\$.35
For 850-foot hole.....	.59
For 1,142-foot hole.....	1.02

These comparisons illustrate that the basis of
cost of the first 50 or 100 feet cannot, by any
means, be relied on as the correct basis for the
work as the holes deepen.

Freakish Gas Meters.

Everyone who keeps house and burns gas
knows what queer things gas meters are. There
are times when they seem to be endowed with
supernatural vitality that enables them to go on
registering when the house is shut up and no
gas is burned. It is most likely the force
of habit, but the companies of course are not to
blame for such vagaries. When their meters
report a certain amount of gas material con-
sumed, what else can they do than to make out
their bills and insist on payment. It is the
guilty gas meter that is to blame; and yet,
strange to say, it is difficult to bring the people
to a realization of this fact. Last summer Gen-
eral Siciles closed up his house in New York
and went to Europe, but before he left he took
the precaution to cut off the gas supply near
the meter. But that self-willed whimsical in-
stitution went right on registering all the same,
and of course when he came home a bill was
presented which, he promptly refused to pay,
and also prevented the company from shutting
off his supply by suing out a writ of injunction.
After considerable litigation, it has recently
been decided by the courts that a company must
prove the justice of its claim before it can col-
lect a bill. Perhaps the sympathy of every
community will be with the company and
against General Siciles for disputing the an-
cient integrity of gas meters. The fact that he
had closed his house and gone to Europe cuts
no figure in the case; and then, if a respectable
gas meter should take a notion to lie, how are
the companies to find it out? It may keep on re-
porting the month's figures over and over again,
but who is to blame? If people will burn gas and
have meters in their houses they must put up
with such vagaries. Such freakishness is very
common, and likely to happen in the best of
families until the custom of using electric lights
is thoroughly established, and then perhaps
these meters will be cured of their fantasies.

A LETTER received at Silver City, Idaho, from
a gentleman in Cenr d'Alene, says that mining
region is as rich as Boise Basin ever was, and
by far more extensive. Much gold-bearing
quartz is found. Nothing can be done there
before June.

San Diego Coal.

Some new coal fields have recently been dis-
covered in San Diego county, in this State. The
coal mine is called the McIntosh and Cheney
mine. It lies in a southerly direction from
Colton some twenty-five miles, and from Laguna
Station, on the California Southern, four and a
half miles. The land lying between the mine
and Laguna Station is a level plain. By means
of a side track there could be some fifty villages,
towns, etc., in a radius of fifty-five miles,
supplied with home coal, including Riverside,
Colton, San Bernardino, National City, Los
Angeles, etc. These places are now compelled
to pay high prices for coal. The new find, if it
turns out as is hoped and expected by its
owners, will be of great benefit to Southern
California. At present the coal used there is
shipped from Coos Bay, Bellingham Bay and
the Rocky Mountain coal fields.

From a gentleman who lately visited these
mines, we obtain the following information:
The property consists of 640 acres. The dis-
coverers and owners claim 400 acres of coal.
The developments are as follows: On the east
side of the mountain a tunnel was started on
blossom of coal. At forty feet in, the deposit
was struck. At this point the thickness was
4½ feet. From this point the tunnel has been
pushed vigorously through the coal for 240½
feet, disclosing 200½ feet of coal. At the end of
tunnel the thickness of the coal is 7 feet 3 inches
solid. With the limited means the discoverers
have had they have done wonders. As the
tunnel penetrated through the coal, I am in-
formed by the owners, samples have been sent
by Mr. McIntosh & Cheney to San Francisco
for analysis. The tests have been made by H.
G. Hanks, manager of the State Mining Bureau,
and W. D. Johnson, mineralogist and assayer; the
different analyses varying in fixed carbon from
35.35 to 46.82; Volatile matter, 30.40 to 40.27;
water, 10 to 23; ash, 5.36 to 11.25. The vein
of coal shows a remarkable uniformity in thick-
ness, pitch and direction throughout its devel-
oped length.

The coal is nearly identical in character here
with that being received by consumers from
Mount Diablo, Coos Bay. Over 150 tons of
coal have been sold at the mouth of tunnel since
August, 1883, purchased by hotels, canneries,
private residences at Colton alone. The coal is
put in bags in the tunnel by Mr. Cheney, and
wheeled to the mouth of tunnel and sold as per
order from teamsters. The owners claim one
man extracts daily five tons. No powder up to
date has been used in the mine.

In this old way of mining the coal has cost
to mine and deliver at mouth of tunnel \$1.50
per ton. With modern improvements, car-
track and improved cars, this coal can be mined
and delivered at the mouth of tunnel for 50
cents per ton. The late discovery of rich gold
ledges in Pinacate mining district, only 2½
miles from this coal mine, is important. All
mines have a history, and it is only brought to
the public ear through some enterprising paper.
All these new discoveries are worth millions to
the State of California, and every new develop-
ment should be encouraged. Discovered in a
part of California noted only for grapes, oranges,
and tropical fruits, and barren of wood and for-
ests, it is surely one of the grandest discover-
ies that have been made for years in San Diego
and San Bernardino counties. But coal mining
is a new business in Southern California, and
experience and capital are wanting. Still, be-
fore long, no doubt, the mine will be properly
opened.

Saving Gold.

EDITORS PRESS:—In reading over your valu-
able paper of the 19th ult. I see one of your nu-
merous correspondents suggests that the min-
ing public should meet and discuss on some bet-
ter method for the recovery of gold. I do not
agree with your correspondent that the loss is
as much as he says, nor do I want to enter into
any discussion with the Doctor further than
what concerns myself. He says: "I am, from
what little I know of Morris' system, inclined
to think well of his process, but he must demon-
strate, by actual working tests of large quan-
tities, that his method is what he claims it to
be." What would be better to demonstrate my
desire to try my process than to say that only
a little over two months ago I offered to pay a
gentleman very well known to Mr. Drake for
the tailings running off. He answered me that
he saved all the gold. I went again, at his re-
quest, to his house, where I again asked to buy
his waste, when he told me "Mr. Morris, stop
right here, and do not mention about the tail-
ings any more, as you can't get them, not even
if you put right down here on the table \$1,000
for every ton of ore we crush." Of course, that
ended the matter. I then went to an acquaint-
ance in Sonora that I thought had some in-
fluence with the gentleman referred to, for him
to see if he could not get the tailings for me on
some terms. That gentleman referred me to
the owner in San Francisco, and where I had no
better result. I made a very liberal offer, and
I am ready at any time any one is willing to
give me the opportunity to fully demonstrate to
Mr. Drake or any one the value of my process.

FRED MORRIS.

San Francisco, Jan. 28, 1884.

The Cœur d'Alene Placers.

The Cœur d'Alene placers are way up in the northern corner of Idaho, where the width of that Territory is circumscribed by Montana and Washington, apparently having more than their share of the land. The nearest railroad town is Rathdrum. The map we give herewith shows the Cœur d'Alene region, and its relation to the railroad, and also the position of Rathdrum. People are still going into the region though the snow is deep.

People are coming in via Trout creek, which is the nearest point on the Northern Pacific railroad, distant about seventy-five miles. They come in from one to two days on snowshoes. A letter from Spokane to the *Truckee Republican*, written by P. J. Ward, says: There is considerable excitement in this city about the Cœur d'Alene mines. Some few from here have already started with their outfits for the mines. Two dog trains left here for the diggings yesterday, with almost 150 pounds of freight to the dog. They expect to get there in five or six days. The Cœur d'Alene mines are about 100 miles from here. From Spokane to the Mission, about 60 miles, the trail is good, but the rest of the trip is hard and dangerous. There is some talk of opening a road from Spokane to Eagle City, which is the principal town in the Cœur d'Alene mountains. In case the road is opened, Spokane, it is thought, will be the miners' headquarters. The weather is so cold that the road may not be opened for some time yet. There are three or four different routes to the mines. Rathdrum route is the one most traveled. Rathdrum is about

Final Decree on the Debris Suit.

Deputy U. S. Marshals are serving the final decree in the debris suit on the hydraulic miners in parts of this State. Marshal Peterson has been in Nevada counties serving notices, among others, on the Superintendent of the Milton, North Bloomfield, Sailor Flat, Mazanita, Omega and Excelsior claims. There has been no attempt on the part of the miners to evade the service, and the Marshals have been treated with courtesy.

The following is the final decree in the case of Woodruff vs. the North Bloomfield Mining Co., which case was decided early in January, by Judge Sawyer, and this final decree filed January 23, 1884:

This cause came on to be heard upon the bill, answer, depositions and the other proceedings in the case, and was argued by counsel.

On consideration whereof, it is by the Court ordered, adjudged and decreed as follows, to-wit:

That as to defendant, the Conly and Gowell Consolidated Mining Company, the bill be, and it is hereby dismissed.

And that the defendants herein, to-wit: the "North Bloomfield Gravel Mining Company," and its officers, agents, servants and employees, and each and all of them, and the "Milton Water and Mining Company," and its officers, agents, servants and employees, and each and all of them, and the "Omega Gold Mining and Ditch Company," and its officers, agents, servants and employees, and each and all of them, and the "Excelsior Water and Mining Company," and its officers, agents, servants and

defendants or defendant so applying, upon any showing which the Court may deem sufficient that the conditions have been so changed that the discharge of such mining debris by said parties or party, so applying, into said streams, or any of them, may be resumed or otherwise conducted, so as not to create, or continue, or contribute to create or continue the nuisance complained of, or a nuisance of a similar character, and so as not to injure or damage, or contribute to injure or damage said complainant, or upon any other grounds hereafter arising satisfactory to the Court. And for the purpose aforesaid, the Court hereby reserves the power to modify or suspend said injunction in whole or in part, as the exigencies and equities of the case hereafter arising, may require.

(Signed), LORENZO SAWYER,
Circuit Judge.

Aluminum in Nevada.

[By our traveling correspondent, B. W. CROWELL.]

The Stock Exchange mine is situated about 200 yards west of the Navajo mine. The ledge is about 8 feet thick and traceable for a long distance without excavating. As yet it is only prospected to the depth of 45 feet, and so far, the assays in gold and silver are low grade sulphide ore. No drifting has been done. There is some water already in the shaft.

Passing through the ledge proper, the gold and silver bearing vein, they encounter a large body of aluminum ore—a very fine quality of porcelain clay, containing 85 per cent silicate of alumina, as reported by an analyst.

Mr. E. M. Laferty, the locator, has a certificate of assay made by Prof. Price, of San Francisco, giving in 100 parts of the ore assayed by

gives many valuable alloys, as with copper, giving aluminum gold; with silver, bismuth, etc., giving non-corrosive bronzes; some of which are especially valued for mine fittings and appliances, or for any machinery exposed to corrosive agents.

These bronzes are susceptible of being rolled down to nice gauge work and make elegant cups, vases, covers, knives, forks and almost all kinds of household metallic wares. In many respects it is superior to silver in its resistance to the action of various chemicals. It has been much used in the manufacture of very delicate balances, and assay scales. Some of its special features are best understood when given in comparison with some of our common metals:

METAL.	One cubic foot weighs—	Tensile strength in lbs. per sq. inch.	Length of bar cast in one foot length, its own weight only.
Aluminum.....	168	20,880	23,000
Steel.....	490	75,000	23,000
Wrought iron.....	480	50,000	15,000
Brass.....	5	30,000	9,800
Cast iron.....	443	10,500	5,950

The most valuable experiments and successful practical results pertaining to the extraction of this metal have been attained in France, and from the Paris Aluminum Society the principal supply of this metal is obtained. The Webster processes and experiments have been kept carefully as secrets, but parties claiming to be informed explain it in these words: "A given quantity of alum and pitch, which are first finely pulverized and mixed together in a calcining furnace, by which means 38 per cent of water is driven out, leaving the sulphur, potash and



NORTHERN PACIFIC RAILROAD MAP, SHOWING LOCATION OF THE CŒUR D'ALENE MINING REGION, IDAHO.

30 miles east of Spokane. Trout creek route is over 100 miles from here. I intend to go to the mines about the first of February. There are about 300 men there now, but they can do nothing, the snow being about four feet deep on the level, yet there are men going out and in every day. Flour is worth \$50 a barrel, there.

Samuel Allison, on Tuesday of last week, passed through Deer Lodge, Montana, en route to Butte, from the Cœur d'Alene mines. He reports to the *New Northwest* a good passable trail open from Trout Creek station, on the Northern Pacific railroad, to Eagle City, a distance of about 35 miles. He walked over the trail between the above two points in 18 hours, and said that aside from one high summit to cross, the traveling was as good as along the streets of Deer Lodge. Mr. Allison has a claim in the new El Dorado, and feels sanguine that it will pan out well when he gets prepared to work it properly. His claim, in common with others, embraces 20 acres, but as a rule locators of these large tracts have taken in from three to a dozen partners, thus dividing the ground up among a large number of people. Being questioned as to the proposition made by the miners to cut claims down to small lots, he said that any arbitrary action on the part of the miners looking to that point would be after all laws of the county and Territory had been exhausted, resisted by the Federal government. At least a communication from the Secretary of War at Washington had been received to that effect. Between 600 and 1,000 men are now in the diggings, but little was being done other than building houses and preparing spring. The first of next June has been fixed upon as representation day; and, according to resolutions passed at a recent miners' meeting, further jumping of claims will be prohibited until that date. The miners now feel secure in their rights, and are not afraid to leave the camp in search of means and provisions with which to work their claims.

employees, and each and all of them, and also B. D. Chadwick, sued herein by the name of D. B. Chadwick and O. D. Campbell and the firm or partnership of Chadwick & Campbell, composed of said two last named persons, and their each and all of their agents, servants and employees, and Hannah Conly, as executrix of the last will and testament of John Conly, deceased, and who is substituted as a defendant in place of said decedent, and Orrin Gowell, and their each and all of their servants, agents and employees, are perpetually enjoined and restrained from discharging or dumping into the Yuba river, or into any of its forks or branches, or into any stream tributary to said river or any of its forks or branches, and especially into Deer creek, Sucker Flat ravine, Humbug creek, Scotchman's creek, any of the tailings, boulders, cobble stones, gravel, sand, clay, debris or refuse matter from any of the tracts of mineral land or mines described in the complaint. And as from causing or suffering to flow into said rivers, creeks or tributary streams aforesaid therefrom, any of the tailings, boulders, cobble stones, gravel, sand, clay or refuse matter resulting or arising from mining thereon. And also, from allowing others to use the water supply of said several mines or mining claims, or any part thereof, for the purpose of washing into said rivers and streams, any earth, rocks, boulders, clay, sand or solid material contained in any placer or gravel ground or mine.

2. That the complainant recover of the defendants above named, save the Conly & Gowell Consolidated Mining Company, his costs in this suit, and the same be paid by said defendants to complainant.

3. That the defendants, or either of them, may, at any time hereafter, apply to this Court upon due notice to the complainant or George Caldwell, Esq., his solicitor, for a modification or suspension of this injunction as to such

him 19.48 parts of metallic alumina, or nearly 20 per cent of metal, 389.6 pounds per ton of ore which is generally quoted at about \$2 per pound, or \$779.20 value.

These figures look large for value to exist in a fine, pure clay. If they are reliable, then the question most prominent is in regard to the quantity of this silicate and its accessibility.

This mine of alumina forms the foot wall of the Exchange silver mine, and is of great thickness, as the bottom of it has not yet been reached nor any limiting boundaries, except the ledge above. My attention was first called to it by seeing a painter using it as a white paint for his dwelling, and noticing the pure white covering of the wood. It mixes readily with hot water, and forms a very smooth, soft white paint—differing very much from lime by retaining its consistency more as past; instead of settling—and thus admits of giving the surface a perfect covering at one brushing.

From what I saw of it when used as a white-wash, I would infer that when properly ground with oil it might be found a cheap substitute for white lead, and in pure whiteness fully equal to it; and possibly retain its pure whiteness longer than the other, as aluminum is a metal less easily tarnished by exposure than silver. As a paint alone this may yet enrich its owners, as the salt, soda and borax beds, that for years were unvalued are now producing large revenues to their owners. So may these great resources for a very valuable metal soon attract the parties who may have the knowledge and the financial ability to utilize this rich deposit. Some claiming practical knowledge, say this will with the proper additions, produce the finest of porcelain ware. If the residue after taking out the metal can be used either as paint or for porcelain, it is in that case enhanced much in its value.

It is a very valuable metal where lightness or non-corrosive properties are essential. It

alumina with oxide of iron. The calcined mixture is then put into vertical retorts, and steam and air are forced through, which leaves a residue of potash and alumina only. This residue is afterwards placed in a vat filled with warm water, which is heated with steam. Potash is thus leached out and alumina left as a deposit. The potash liquor is then run off, boiled down, while the alumina precipitate is collected in sacks and dried. It is then ready for making chloride of aluminum.

Alumina deposit thus obtained contains about 84 per cent of pure alumina, while that which is obtained by the old process of precipitation has only 65 per cent.

The constituents of Mr. Webster's alumina deposit, as analyzed by Professor Jones, are given: Alumina, 84.10; sulphate zinc, 2.63; silica, 7.40; water, 4.20; alkaline salts, 1.62. In order to complete the process and convert it into aluminum (the metal), the chloride of aluminum is treated with sodium in order to withdraw the metal.

If this bed of rich aluminum clay will verify these representations as to quantity and assay value in metallic per centage, it will yet command the attention of foreign scientists and men of capital, if the State of Nevada, with its School of Mines, cannot give it proper attention. Let France take a back seat in the production of this very useful metal.

NEW MINES.—Frank Raymond and James Hambley, who have been prospecting in Bottle Creek mountains, some forty miles northwest from Winnemucca, have discovered new mines. They find well defined leads carrying plenty of ore of a low grade. They assay from \$20 to \$40 per ton.—*Silver State*.

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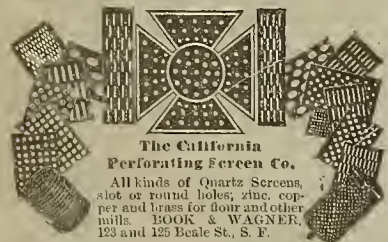
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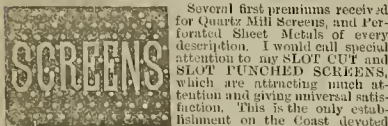


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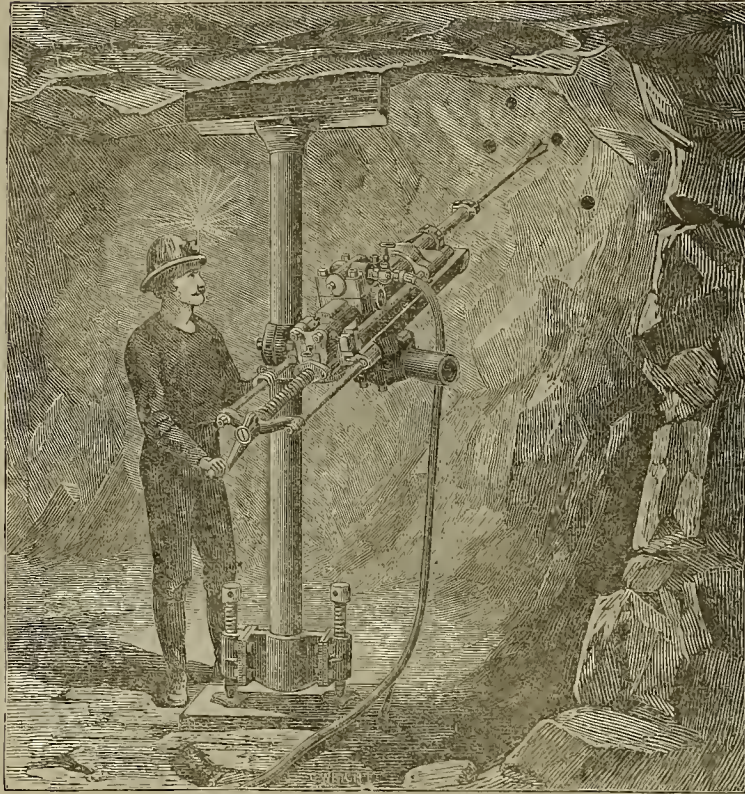
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Ingersoll, D2 3", beat Rand 3 1/2".....	.744 " "
Ingersoll, D2 3", beat National 3 1/2".....	.505 " "
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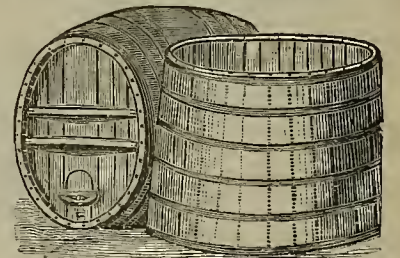
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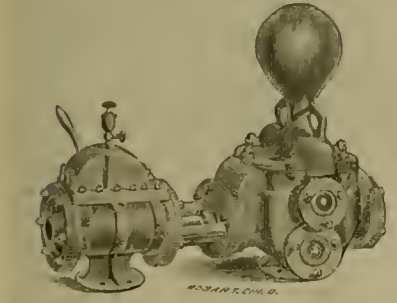
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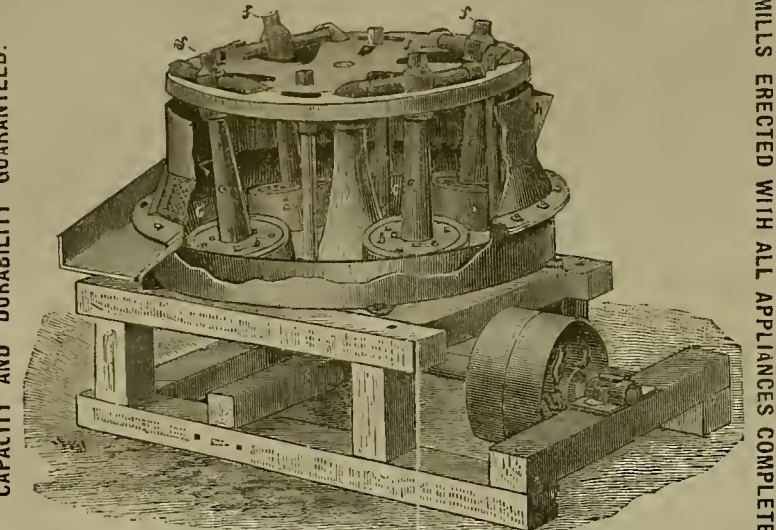
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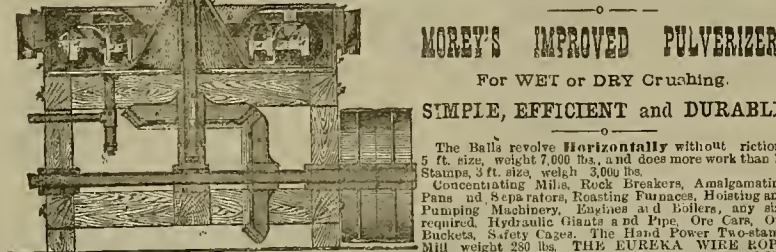
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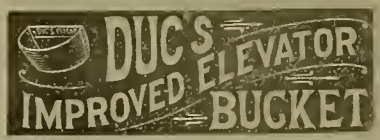
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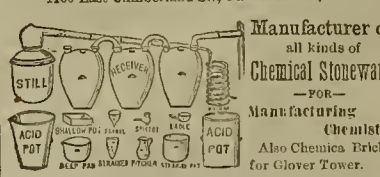
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in *Draway & Co.'s* SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING JANUARY 22, 1884.

- 292,151.—VEHICLE SEAT SPRING—W. R. D. Allen, Hardman, Or.
292,405.—GATE—W. Bruce, Elk Grove, Cal.
292,416.—HINGE—Jos. Decombe, S. F.
292,297.—CULTIVATOR—W. Fruhling, Sr., San Jose, Cal.
293,165.—CABLE RAILWAY PROPULSION—W. W. Hanscom, S. F.
292,431.—WATER WHEEL—Robt. Hewson, S. F.
292,337.—GRATE BAR—John Mailer, S. F.
292,344.—HOISTING APPARATUS—P. J. Mitchell, Dragon, A. T.
292,366.—CAR FOR INCLINES IN MINES—J. Rosquist, Park City, U. T.
292,373.—SHEEP ENUMERATOR—H. A. Shipp, Fresno, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

WATER WHEEL.—Robert Hewson, S. F., Assignor to Globe Manufacturing Co., S. F., No. 292,431. Dated Jan. 22, 1884. This invention relates to certain improvements in water wheels or motors, and it consists of peculiarly formed buckets and a case having a diaphragm with inclined discharge holes so placed with reference to the wheel that the first impulse will be given by the motion of the water striking the front portion of the bucket, while the water escaping through the rear portion of the buckets gives a re-actionary force; and also in a manner for regulating and controlling the flow of water through the wheel. The wheel is designed for light work, such as driving sewing or other small machines, and the inlet pipe is intended to be screwed directly upon a common cock or faucet, the shaft thus lying horizontally and the belt from the pulley may lead directly to the machine.

SHEEP ENUMERATOR.—Henry A. Shipp, Fresno City, Fresno county, No. 292,373. Dated Jan. 22, 1884. This is a peculiar device for automatically counting sheep or other animals. The object is to facilitate the counting of animals which herd together in large numbers, and to insure the accuracy of the count; also in selling a number of sheep a discussion may arise as to the accuracy of the count, and this necessitates a re-count which, in the ordinary method, causes delay and is scarcely more to be relied on than the first count. The animals, as they pass through a gate from a corral, strike jamb flaps, on a "dodge-gate," by which recording mechanism is operated to record the passage of the animals passing through.

COOKING STOVE.—Robt. S. Burns, S. F., No. 290,316. Dated Dec. 18, 1883. This improvement consists in a double construction, with one shell within the other to provide a space between the two to receive the heat from the inner or fire chamber and conduct it to the ovens, and in certain return passages for the smoke and unconsumed gases, whereby they are subjected to a continued high temperature for more perfect combustion, together with secondary air supply passages and an arrangement of ovens.

EDGER.—J. A. Robb, S. F., No. 290,358. Dated Dec. 18, 1883. This invention relates to certain improvements in that class of machines for resawing lumber into scuffling, studding, etc., now known as "edgers." It consists of a means for raising and lowering the upper feed rolls and for controlling the mechanism by which this is done, and also of a means by which the feed rolls are connected so as to be driven simultaneously, notwithstanding the various distances to which they may be separated.

CARTIDGE-LOADING MACHINE.—Jonathan B. Richardson, Mountain View, Santa Clara Co., No. 288,740. Dated Nov. 20, 1883. This invention relates to a new and useful cartridge loading machine, and it consists in the means for receiving and supporting the shell, and in the means for charging it with powder, wads and shot. The object of the invention is to provide a simple and effective machine for loading cartridges.

DIRT SCRAPER.—Daniel A. Faulkner, No. 290,410. Dated Dec. 18, 1883. The invention relates to a new and useful dirt scraper for leveling land, and it consists in a peculiarly mounted and suspended bowl, and a novel means for dumping it. The mechanism is simple, rendering the device an efficient implement for leveling or scraping land.

WINDOW BLIND.—Joseph Williams, San Jose, No. 291,254. Dated Jan. 1, 1884. The invention consists of a series of slats united by a flexible connection and sliding upon rods or guides

upon which they are mounted, in such manner as to enable them to slide back and forth on said guides, and to turn from one position to a position at right angles to open or close the window. The object is to provide an easy-working and economical window blind.

VAPOUR LAMP BURNER.—J. C. Ludwig & Wm. Wainwright, S. F., No. 290,337. Dated Dec. 18, 1883. This invention relates to that class of lamp burners which are adapted to volatilize liquid hydro-carbon, and commonly known as vapor burners; and it consists in a novel construction of parts and arrangement of jets or holes to produce a fan-shape similar to a gas burner.

The Use of Belting.

A second edition of the standard work on "The Use of Belting," by Jno. H. Cooper, has been issued, and is for sale here at Bancroft's. The book contains numerous illustrations of approved and actual methods of arranging main driving, quarter-turns, and various belt fastenings; rules and various principles for speed or calculating the size of driving power of belts; plain, particular and practical directions for the treatment, care or management of belts, description of many varieties of belting, and chapters on the transmission of power by ropes, iron or wood, frictional gearing, and the strength of the belt leather, the experiments of Morin, Briggs and others for determining the friction of belts under different tensions. The collection of rules, statistics, etc., with reference to all the points connected with belting or belting, is most complete and full. No better assimilation of belt data can be made than that presented in this work. The facts and figures given were first compiled for private use, then printed in a magazine, and then in book form. The second edition has more new matter, gathered since 1877, when the first one appeared.

The work is a standard one. Mr. Cooper, the author, has been some little time on this coast, and is now employed in one of our large and growing manufacturing establishments. All who have seen the first edition of his work on belting know its practical character.

THE NEW PLACERS.—Mr. W. T. Simpson, who has just returned to San Francisco from the Cœur d'Alene mines, writes to the *Call* to say if people who think of emigrating there know when they are well off they had better stay in California, for there is extremely cold weather and over five feet of snow, and provisions are very high; \$60 a hundred for flour, and other things in proportion. There will be nothing done till the middle of April, and unless parties go in before the snow melts in March, they cannot get in until May or June, on account of the floods. Whoever goes has blankets to pack and a good buffalo robe to keep out of the cold, and they must knock up a log hut to live in.

Ratbdrum is the best starting point on the northern road, as from it there is an old road to the fort, and provisions, etc., are cheaper. I might say there are men wintering all along the road, waiting till the weather is milder to make a break in. There are thirty thousand people expected to go in this spring. All the men discharged from the construction department on the N. P. and the O. R. & N. are talking of nothing else save the mines. There must be a thousand in Portland alone that can get no work, but who are waiting patiently. There are about 500 or 600 on Frichard and Eagle creeks, and they have taken up ten and twenty acres apiece of government land, so we will not be surprised to hear of big shooting and bloody work in the Cœur d'Alene mines.

ASSAY BY AMALGAMATION.—This is for working results. Take any convenient quantity of the ore powder, add water enough to make a pulp, and heat it. If gold ore, add about 1-40th per cent of cyanide of potassium. If silver ore (not roasted), add 2 per cent of salt, and such other chemicals as may be desired in such proportion as can be profitably used on the large scale. Grind with pure quicksilver for several hours in iron mortar or Buck's amalgamator. Separate the pulp from the quicksilver by washing (panning). If good ore, distil the quicksilver or dissolve it in dilute nitric acid. The gold will remain. If silver ore, strain the quicksilver through a piece of wet buckskin. (Twist the buckskin so as to press the quicksilver through.) Tie the amalgam in a bit of cotton cloth, put it in a dry-cup and heat to redness in the muffle. Collect the metal, gold or silver, wrap it in sheet lead, cupel, part, weigh, and calculate results by percentage.

This extract is from a simple, practical work on "Assaying," by Chas. H. Aaron, now issued and for sale by Dewey & Co., San Francisco. Price, \$1.

If you want a lubricant that will run any thing cool write CHARLES J. WOODRURY, GENERAL MANAGER LUBRICATING DEPARTMENT CONTINENTAL OIL AND TRANS. CO., for "Lubricite." It is the best compound grease in the market. Shipped in 5, 10 and 25-pound cans, half barrels and barrels. Warranted to give satisfaction. Observe the numbers: No. 2 is soft for outside work; No. 3 is medium soft; No. 4 is medium hard; No. 5 is very hard, where unusual lubrication is demanded. Send for Catalogue of Lubricating Oils.

THE mining interests of Sonora, Mexico, are delayed by the imposition of a tax of three per cent on the export of all ore by the State government. Strong protests have been forwarded to the government on this matter.

Proposed Changes in the Land Laws.

A dispatch from Washington says: The subcommittee of the Senate Committee on Public Lands will probably recommend a number of radical changes in the homestead laws. Among them it is proposed to give a homestead claimant one year from the date of entering the land to establish a residence thereon, requiring, however, in the meantime that he shall break and prepare for cultivation a given area of land to establish the good faith of his professions. Under the existing laws he is required to go upon the claim and make it his home within six months of the date of entry. It is further proposed to admit homestead claims to final proof and patent only at the end of seven years from the date of entry, the present term being five years. It is argued that to an honest claimant, who farms the land for his own use, it is of little consequence when he receives a patent, since the entry of the land confirms him in every right but selling it, which he secures by a patent.

As a new feature of the homestead law, and a substitute for the timber-culture law, it is under contemplation to require that within the first four or five years from the date of entry every homestead settler shall plant a specified small area in trees, having previously taken such necessary steps to secure their thrifty growth as is now required by the Timber-Culture Act; this requirement being applicable, of course, only to treeless regions. The reason for grafting a portion of the timber-culture law upon the homestead law is found in the fact that under the former the land usually falls into the hands of non-residents, who have no interest in the cultivation of trees, and whose steps to that end are merely sufficient, under the law, to hold the land until it can be sold to advantage.

But little attention has yet been given to the pre-emption law, but there is better reason for expecting radical amendments than its repeal. The chief amendments suggested in committee look to a prevention of speculation by requiring that relinquishments shall not be accepted by local officers, and that when accepted by the Commissioner the land shall be open for entry by the first applicant, and that two years' actual residence shall precede the purchase of land.

THE OVERLAND MONTHLY.—This sterling home magazine shows continued improvement. The contents of the February number are attractive: "A Shepherd at Court," Chapter VII; "Thought and Speech," Caroline A. Mason; "Notes on the Frazer River," Henry Colbath; "Thomas Lodge and his Friends," Chas. Howard Shinn; "Mirage," A. S. R.; "Aunt Jane in San Francisco," L. J. Dakin; "Cruise of the Ocean Spray," I. M. Baltimore; "February Day on the Columbia in the mountains," H. S. Lyman; "New Japan," Shosuke Sato; "Incident in the Life of a California Detective," "Winter Sunset," M. F. Rowntree; "Chinese Slavery," H. Latham, M. D.; "Through Central Mexico," O. M. Wozencraft; "The Brahmo Somaj, or Protestantism in India," Horatio Stebbins; "The Late War in South America," II. Holger Birkedal; "Ametta," Chapters XXIV, XXV, Evelyn M. Ludlum; "Love's Coming," Thos. S. Collier; "In the Afterglow," "Oregon," In the Etc. and brief articles are: "Law Enforcement," "Japanese and Oriental Women," "A Village Anecdote," "Old Jim." The usual book reviews are given also. The number is one of considerable interest and literary merit.

The Supreme Court of this State has decided that when an owner first begins his assessment work for the year on the 31st day of December, and resumes again at or by 7 o'clock of the morning of January 1st, and continues from day to day till \$100 worth of work has been done for the preceding year, no re-location of such ground will hold good. The fact of the owner of the ground doing work as described is considered sufficient to keep his title good.

THE MINING AND SCIENTIFIC PRESS, of San Francisco, one of the most valued of our exchanges, in its issue of the 19th January last gives a full review of the mining States and Territories for the past year, as well as the text in full of the decisions of Judges Sawyer and Deady in the "mining debris" case. The number is invaluable to miners, and should be purchased and read by all.—*Rio Grande Republican*, Jan. 26.

THE hulk of the steamer *Senator*, which ran on the Sacramento river in 1850, will go into the dry dock within a few days, preparatory to being turned into a temporary harkentine, so as to enable her to sail to New Zealand, where she is to be used as a barge by an Auckland corporation.

A SURVEYING party has arrived at Bakersfield for the purpose of locating the route for the railroad extension from Soledad to a junction with the Southern Pacific in Kern county. The *Californian* thinks active work on the extension will be commenced early in May.

Lost Papers.

If any subscriber fails to receive this paper promptly, after making due inquiries at the Postoffice, he is urgently requested to notify this office by letter, that we may send the missing papers, and, if possible, guard against further irregularities.

Mining Share Market.

Mining stocks are not very active. Attention has been turned to Bodie of late more than elsewhere, and there has been a sort of Bodie boom. Our stock tables show the fluctuations. Up at Gold Hill the low stage of water in the Carson river still retards all ore extraction, except that required to keep going the few stamps that can be run.

At the Alta the east drift on the 2,100 level is being pushed ahead as rapidly as possible for the ore body, and all other work is progressing favorably.

At the middle mines all is now going on well. The new hydraulic pump is doing excellent work, and the Chollar-Norcross-Savage shaft is now being sunk to the 2,800 level as rapidly as possible. The sinking will be continued to the 3,000, but at the 2,800 level a station will be opened, and a drift started to the west.

The *Virginia Enterprise* says: In the Union Consolidated the main north and south drifts are now fast nearing each other. The men working in the two headings can now very distinctly hear the sound of the drills. This will be a very important connection as it will form an air gallery and base of operations on the 3,100 level from the Ophir on the south to the Sierra Nevada on the north. Once the connection is made, new life will be seen in the north end mines. Prospecting drifts will be started both east and west in the Union Consolidated and Sierra Nevada, and operations will be resumed on the 2,900 level and at other interesting points in the Mexican.

LOWERING PUMPS.—Sinking the main shaft of the Contention mine, Tombstone, had to be stopped for a time, waiting the arrival of large screws from San Francisco, with which to swing the working barrel and drawlift of the pumps, the formation in the bottom of the shaft being so soft that the working harrel of the pump buries itself whenever the ground is moved about its base. The *Epitaph*, in speaking of the subject, says that this working harrel is 200 feet in length, made in sections of very heavy castings, and contains, when the pumps are at work, 30 tons of water. This, with the enormous weight of the 200 feet of working barrel, makes a load that it is difficult to support. The screws for this purpose will be 15 feet in length and 3 inches in diameter, with a very heavy thread, and will be placed upon a station built for that purpose, one on each side, and passing through a heavy collar made fast to the working harrel. By this means the pump may be lowered a few inches at a time with ease and safety. The water in the shaft has been easily controlled for the last few days, the pumps making 4½ strokes per minute. As soon as the arrangements for supporting the pumps are completed, sinking in the main shaft will be continued.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

JOHN MUIR, Superintendent of Traffic of the Northern Pacific road, has resigned, to take the General Managership of the Oregon Improvement Company for a term of years. He will reside in Portland, and will attend to the entire Pacific coast interests of the company, including their railroad and steamship lines, and coal interests.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JAMES G. HOAG—California.
B. W. CROWELL—Nevada.
I. M. LEHLY—San Bernardino and San Diego counties.
J. J. BARTELL—Sacramento county.
C. E. CURTIS—Kern and Fresno counties.
A. S. DENNIS—San Mateo county.
A. C. KNOX—Tehama, Yuba and Yolo counties.
Wm. R. McQUIDDY—Tulare county.
F. M. THILMAN—Fresno county.
ED. MACK—Santa Clara county.

Job Press for Sale or Exchange.

We have just received a new improved Rotary Job Printing press of approved style and make, which we will sell at a bargain or exchange on favorable terms for a Washington hand press. Size of chase inside 7x10 inches.

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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

BOUND VOLUME OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

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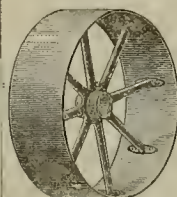
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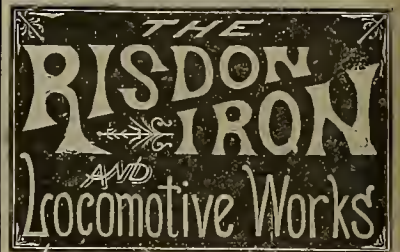
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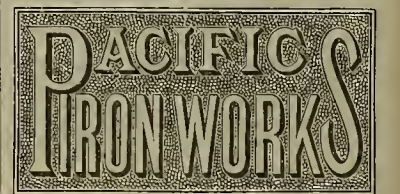
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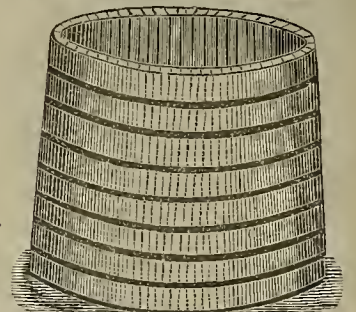
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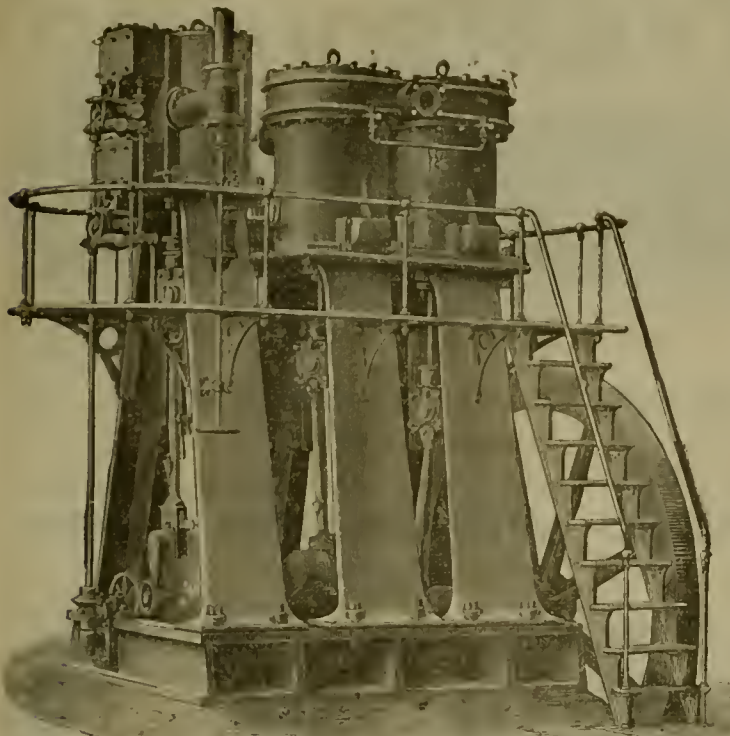
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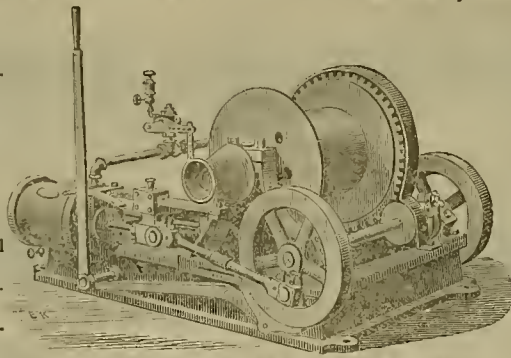
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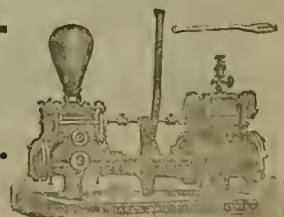
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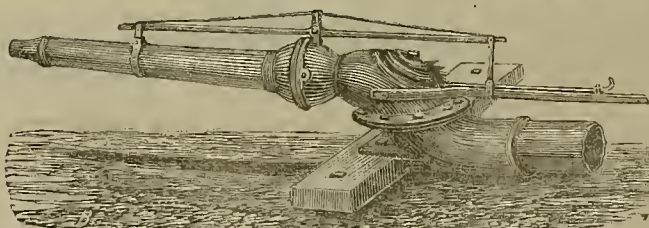
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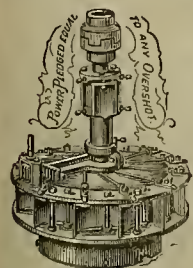
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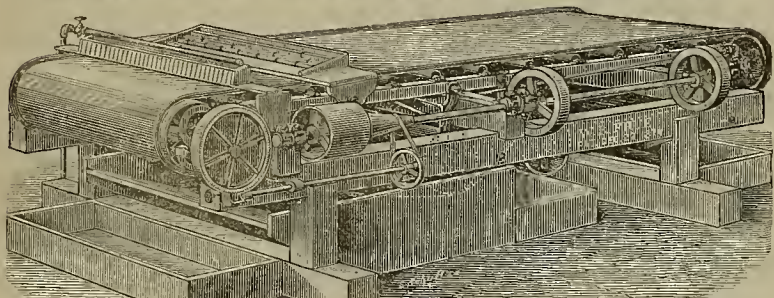
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That suit has been commenced in New York against an end-shake machine similar to the "Triumph," and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That we are and have been ready, at any time, to make a competitive trial against the "Triumph," or any other machine, for stakes of \$1,000.

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SAN FRANCISCO, CAL.

January 3, 1884.

William Hawkins.

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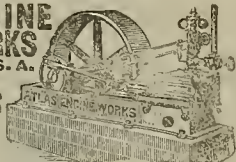
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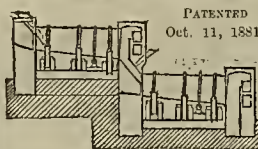
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An Illustrated Journal of Mining, Popular Science and General News.

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Geology of Eureka District.

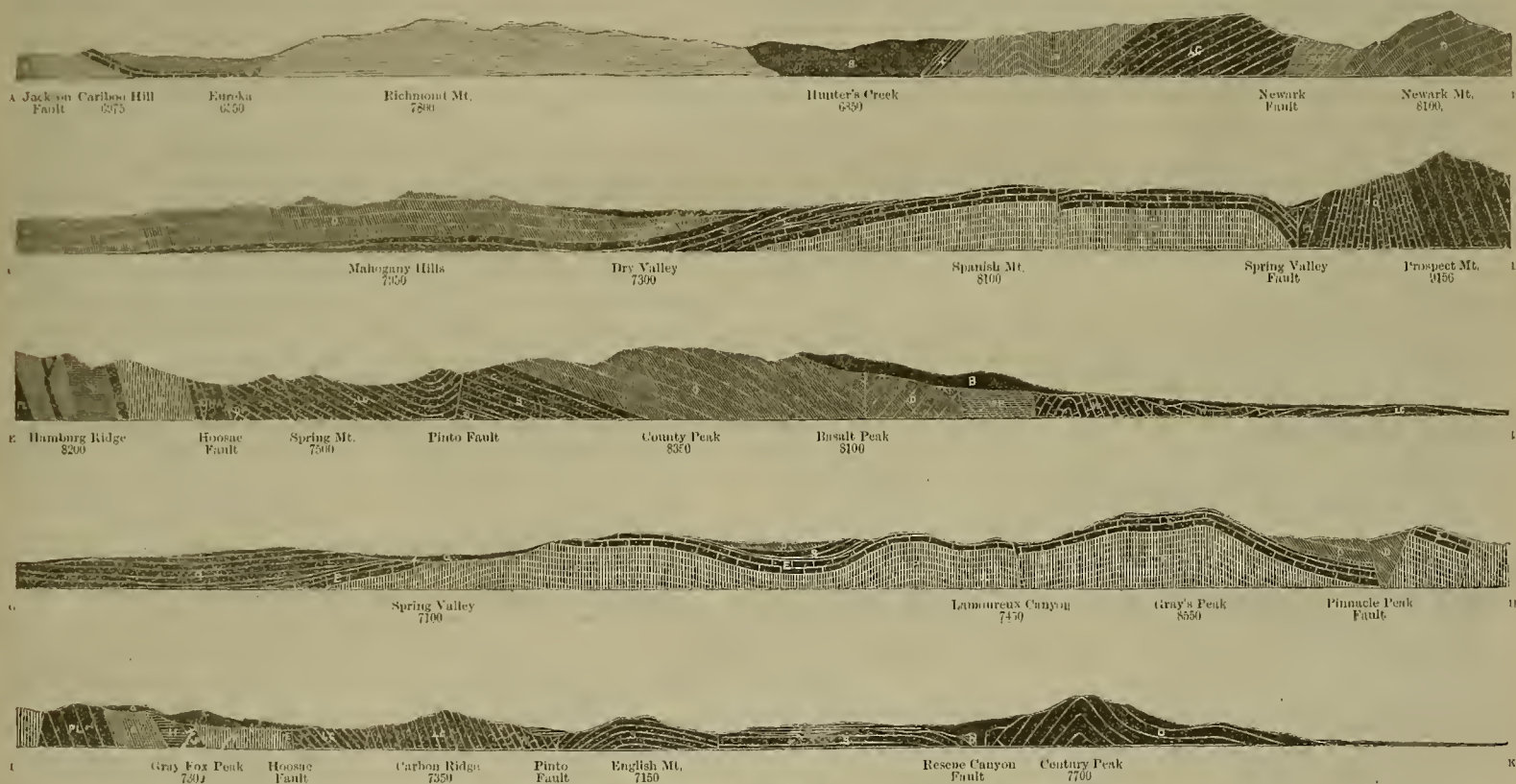
A short time since we gave a brief abstract of a report by Arnold Hague, on the geology of Eureka district, Nevada. The district is one of great economic interest, as the seat of active mining industry, and has been as well the center of immense volcanic action. It was therefore judiciously selected for very careful mining and study. The monograph of Mr. Hague for the United States Geological Survey is purely geological in its character, and is certainly a careful study of a comparatively small block of mountains, which may be called the Eureka mountains. It is not Eureka district

Hamburg limestone, and SC for Secret canyon shale; PL for Prospect mountain limestone, and PQ for Prospect mountain quartzite. In the Igneous, B is for basalt; R for rhyolite; T for tuffaceous and tuff; A for augite and andesite, and HA hornblende and andesite. The base line of sections is 6,000 feet above sea level.

Section C'D-EF is constructed across the central portion of the Eureka mountain, and therefore presents more of the principal structural features of the region than is shown in either the northern or southern sections. It is drawn through Mahogany hills, Spanish mountain, Prospect ridge, Spring hill and County Peak group, and crosses the Spring valley, Hoosac

follows up New York canyon as far as the reservoir, where it turns and runs south until lost in the quaternary deposits of Fish Creek valley. As the line of the fault has been the center of volcanic action, its outline can only be traced approximately inasmuch as it is almost wholly concealed by extensions of horn blende-andesite and rhyolite, the former variety only appearing on the line of the section. Beyond this narrow belt of andesite comes in the lower coal measure limestone, dipping at first to the eastward, followed by a synclinal fold, which is abruptly cut off by the Pinto fault, beyond which the Lone Mountain silurian of the County Peak group

the Lone mountain silurian. The section shows, then, two parallel displacements of not less than 13,000 feet, which, in the neighborhood of Spring hills, are nowhere more than two miles apart. Continuing along the line of the section east of the Pinto fault, the Lone mountain limestones are partially exposed, followed by a great development of Nevada Devonian, measuring 4,500 feet across the middle and lower beds, and well characterized by organic forms. At Basalt Peak igneous extrusions conceal the sedimentary beds, but the section is constructed from exposures observed both to the south and east, and may be readily understood by reference to the map. Section GH-IK



GEOLOGICAL SECTIONS OF EUREKA DISTRICT, NEVADA.

alone, as several other districts are in this mountain area.

By reference to the accompanying cross sections, the broader structural features of the mountains of the Eureka district will be readily understood.

The lines of the cross sections have been accurately constructed along carefully selected east and west lines. The sections are a reduction from the large double plate in the atlas, which forms a part of the final report, and are drawn on a scale of 3,600 feet to the inch, with the base line taken at 6,000 feet above sea level, the height of the adjacent valleys.

The letters on the sections refer to the geological periods. The Q is for mountain quaternary; VQ for valley quaternary. In the carboniferous, C is for upper coal measures; W for Weber conglomerate; LC for lower coal measures; DP for Diamond; PK quartzite. In the Devonian, WP is for White Pine shale; D for Nevada limestone. In the Silurian, S is for Lone mountain sandstone; K for Eureka quartzite, and P for Pogonip limestone. In the Cambrian, HS is for Hamburg shale; H for

and Pinto faults. The section intersects Prospect ridge just to the north of the summit of Prospect Peak, and brings out the anticlinal structure in the quartzite on the west slope overlaid on both sides of the fold by the Prospect mountain limestone, which to the east forms the summit of the main ridge. This is in turn overlaid by Secret canyon shale, Hamburg limestone and Hamburg shale, the remaining subdivisions of the Cambrian, all of which stand inclined at about 70° to the east. As the section is drawn across quite a high saddle at the head of New York Canyon, connecting Prospect Peak and Hamburg ridge, the erosion of the Secret canyon shale is not so well shown as it would be if the section were drawn either to the north or south of this point, but is quite sufficient to bring out the prominence of the Hamburg ridge, which is everywhere parallel to the main mountain. Overlying the Hamburg shale occurs the Pogonip limestone and Eureka quartzite, which occupy the long slope down to the Hoosac fault. The Hoosac fault extends along the base of the ridge approximately parallel with its trend. It

starts in along the southwest base of Richmond mountain, and runs southward just east of Hoosac and English mountains, and, like the Hoosac fault, is finally lost in Fish Creek valley, two faults being roughly parallel in their trend.

Between the two faults the thickness of the carboniferous limestone, where it has been best observed, has been estimated at 3,500 feet. If uppermost beds on the west side of the Hoosac fault belong to the summit of the Eureka quartzite, and the base of the lower coal measures is exposed on the east side of the fault, then the amount of displacement would be measured by the combined thickness of the Lone mountain limestone, Nevada limestone, White Pine shale and Diamond Peak quartzite, which in the general section is given at 12,800 feet. As a portion of the carboniferous limestone has also been carried down, it may be assumed that the vertical displacement amounts at least to 13,000 feet, or nearly two and one-half miles. The displacement along the Pinto fault is even greater, as along the Carbon ridge the overlying Weber conglomerates are brought down against

is drawn across the southern end of the mountains in a continuous line from west to east, passing through Gray's peak, Gray Fox peak, Carbon ridge and Resene canyon. The only Cambrian rocks found at the surface are the Prospect mountain limestone, the overlying epochs, together with Pogonip limestone and Eureka quartzite, being buried by flows of rhyolite. Between the Hoosac and Pinto faults the section again crosses the carboniferous block, which here includes a portion of the Weber conglomerate, as well as the lower coal-measure limestone, both members lying inclined at angles varying from 60° to 70° to the eastward.

The two epochs of carboniferous limestones are nowhere better shown in the district than along the line of the section. The lower limestone dips uniformly to the west at an angle of 25° to 30°, with a development of 3,700 feet of beds, overlaid by the Weber conglomerate, 2,000 feet in thickness, showing a synclinal and anticlinal fold, beyond which come in the upper coal-measure limestones, but only represented with a thickness of 500 feet.

CORRESPONDENCE.

Paradise Valley and Paradise Mines.

[From our Traveling Correspondent.]

EDITORS PRESS:—Winnemucca, the county seat of Humboldt county, on the C. P. R. R., 90 miles east of Reno, is one of the most prosperous of the Nevada railroad towns. It has on the Humboldt river and other valleys hay and grain lands and a large scope of good stock country to support it, besides some good mining districts also tributary. To the railroad passenger the town is almost entirely hid, and most of those passing have no suspicion of the existence of a town of 673 inhabitants, a nice long business street and the different streets of neat dwelling houses that are about a quarter of a mile from the depot.

The Humboldt river makes its serpentine course down the valley, and, like all Nevada rivers, reserves the right to sink below the surface occasionally. From Winnemucca by the stage road, over some rolling uplands for twelve miles, you reach the first dwelling, a stage station, post-office and toll-house, the toll being for sage-brushing a few miles of sand drift, that would be very heavy were it not thus bridged or littered with the brush and lumpy bark of the sagebrush. A short distance beyond this dividing ridge we enter Paradise Valley. The name sounds lovely, and there are seasons when this is not entirely a misnomer. The valley is thirty-five miles long, and an average of one to five miles irregular width. It is considered here a thickly settled valley, partially irrigated, and many nice tracts of well fenced lands producing alfalfa, barley and wheat. The alfalfa gives good satisfaction as a profitable forage crop; the natural grasses produce good crops without any plowing and sowing.

The Best of the Valley Lands

Are enclosed generally with barbed wire fences. Some of the San Francisco meat merchants have fine outfits here for supplying their stalls with the very choicest young stock. Though the raising and fattening of cattle seems to be the great business, it is not at all the exclusive business, as the two flouring mills of the valley can testify to a large amount of wheat and barley being raised, the "Farmers' mill," capacity 12,000 pounds daily (water-power), on Little Humboldt river, under the charge of R. C. Pennington, turning out excellent flour, judging from the choice bread I ate in the valley. The upper portion of the valley is favored also by another water-power flouring mill of similar capacity belonging to S. B. Pierce, who is also quite a successful farmer and stock man. He has made very good success in his orchard experiments. He brought out some very fine specimens of several kinds of apples, some very large pippins, good greenings, Bellflowers, etc. Hungarian prunes and plums did well; cherries bore well, but the birds would scarcely trust them to ripen. Bartlett pears, currants and gooseberries thrive well. Mr. Pierce had no trouble to sell his apples in the neighborhood for six cents per pound. This valley has a few places well adapted to some berries, currants and a few fruits, but it is frosty generally, and fruit is in danger of being nipped by late frosts.

The residences of the valley are generally quite neat and comfortable—with schools where needed. The village of Paradise, the business center of the valley, is a neat town of about half a dozen stores of a general assortment order, mechanics' shops, two good hotels, and about eight saloons, one good public school with two teachers, but no church. The whole community seemed much interested in some kind of Christmas celebrations; though the weather was quite stormy, there were no postponements. I found the farming people very pleasant, and more happy because their thoughts were much engaged in plans to make others happy. I thought one element that helped the buoyancy of the holiday season was the great

Success of the Paradise Mines.

Situated about 8 miles across the valley in the edge of the mountains.

In 1863 or 1869, the Wild Goose and Paradise mines were located and the district named "Mount Rose" after the huge ledge of red quartz that outcrops fifteen to twenty feet along the crest of the mineral ridge. Considerable ore was taken out—the first was shipped to Salt Lake and Rye Patch for treatment. A small mill was built. The estimated output from the Paradise mine was not less than \$500,000, and some say fully \$600,000, this from a ten-stamp water-power mill. The Bullion mine, with a ten-stamp mill (belonging now mostly to Charles Kemler, merchant of Paradise City) produced about \$350,000 previous to the burning of their mill on November 18, 1883.

The Bullion is called a good mine, being the first extension of the Wild Goose mine, on the south. It is not yet prospected to the depth of 125 feet; it now lies idle, as its owner is fully engaged in other pursuits, who is not a practical miner nor milling expert. The Bullion mill is about three miles from the mine, at the edge of Paradise valley, and has a graded road to the mine.

Wild Goose and Paradise.

Passing this, the next claim on the same grand ledge is the "Wild Goose," and below it the "Paradise mine," a parallel vein, lying 700 ft.

to the east. These two locations, through the perseverance of Mr. J. V. McCurdy, an old Virginia City expert of more than 20 years experience, succeeded in uniting in one corporate company of 100,000 shares. I use the term perseverance, in the fullest sense advisedly—for these mines had been lying idle for two years ("Worked out;" "got no ore in sight," "only surface paying mines.") Mr. McCurdy carefully examined them and undertook the task of convincing the owners, that instead of being worked out, they had not yet had good, earnest prospective work done, and that he saw right there the fullest assurances of a paying mine, at an insignificant amount of expenditure. He hunted up the scattered owners, and set forth to their slow and unwilling comprehensions a programme with the fullest assurances of a quick and ample success. But before he would get around to all the owners, those first converted to his faith in the mines' value, and his plans for making this wealth available, would, many of them, become backsliders, and want to rest quiet yet, for fear they would spend some "good money," and not see it return promptly.

A prominent citizen and farmer remarked to me, "I consider Mack the persevering man of a thousand; for not one of a thousand would have labored with us as he did to convince us that we had a good property, and then to put it in a business shape, and do more than ever he promised in speedy results."

There are interesting points that might be mentioned in this preliminary organizing work, but suffice it to say it was successful; and after seeing the principal part of those interested in the business, I can say they each had one uniform tone of praise and satisfaction in the present management. Last August Mr. McCurdy took possession of the mines: no ore in sight; mill to be repaired and changed to do better work than before; the ditch to be repaired and the dam to be made anew; and to save continuous expense and delays he used a large amount of Portland cement in the dam construction, so that a few thousands of dollars (\$8,500) debt was incurred before the mill was ready and furnished with ore. The August expenses, for running and repairs, exceeded the yield about \$2,500, making a debt of over \$10,000 to be liquidated, and to test the faith of the weak ones concerned. A small crop had now been platted, and since then the harvest has been going on. The Wild Goose yielded for the month of November \$21,000; the November shipment was \$22,273 and the December \$25,000. Since then the 10 stamps have been turning out about \$1,000 daily on average unassorted ore (about \$100 per ton.) The mines look very encouraging. They have now a body of pay ore 14 feet thick in the Paradise, and have struck the same body below 75 feet. The ore is good milling—without assorting showing nice specimens of native silver all through it.

The Wild Goose has one level 225 feet below the surface; have raised above this 75 feet and opened another level there, and raised 35 feet above that, and the ore holds still the same as below, and 8 feet thick, and in the lower drift have opened the vein for 100 feet without a break in the pay ore—here is a ripe harvest of stopings, that if situated at some distant and inaccessible point would make a fine sensation. But here, near the railroad, in the midst of a good agricultural and stock settlement, it is scarcely noticed; and this seems to be the choice of those concerned that but very little notice shall be attracted thither for the present. These mines are

Not Considered at all Developed.

But only a small prospect work started and now carried on by a man without any capital except a long mining and milling experience, coupled with an energy, backed by good judgment and confidence, that would not recognize defeat though claimed by a multitude on the outside. A tunnel 600 or 700 feet will tap the ledge at a depth of 500 feet, and when run on back will tap the Wild Goose at still greater depth, and deliver all the ore at the ore chutes for loading in the wagons at the roadside, thus dispensing with costly hoisting machinery for a long time. The situation of the mines for cheap and convenient opening is very advantageous, and the eight miles of road to the mill is nearly all a moderate down grade.

The year 1884 has recorded already the Paradise Company as one of the dividend paying stocks, and that on a true and genuine basis of production, and not from stock sales or assessments collected. Here is a district

To be Heard From in the Spring.

As I am told many relocations have been made, and old locators have carefully been looking to their sleeping, undeveloped claims, some of which promise well. The Paradise mill has both steam and water power that can be used together or separate as desired. When the water is full head it is ample power, but when only half a full head it lessens very much the expense of fuel for the steam power. The mill is a model of convenience, and quite efficient for the free milling ores—that will probably last long enough to wear it out before they are exhausted—by reaching the change at water level. The tailings are all passed over blanket concentrators, and the heavier portions safely piled up exposed to the sun and air for future workings. There is a system of care and economy apparent everywhere about the works; supplies of salt, ore, chemicals, wood, hay, etc., on hand, so that in case of a prolonged storm, teams need not be exposed nor the mill

obliged to stop. The Superintendent is himself a large owner in the stock of the company, and has a special interest in its success.

Other Mines.

The Red Deer, owned by an Eastern company, is considered a good property, though they are at present only doing assessment work.

The Live Yankee, owned by Nick Freyer, is said to have plenty of good low grade—i. e. \$50 to \$80 per ton.

Oro Cash, owned by Dr. Powell and Wash. O'Neal, has a small development, with good prospects.

The Rattler, owned by Marcott and Brannan, practical workers, has high-grade ores and very encouraging prospects. A carload worked in Salt Lake yielded \$540 per ton. They have shipped some as good to San Francisco works.

Various extensions of the good mines are showing good indications of future value. The district lacks men of capital and more facilities for cheap reduction. Rich men and railroad chiefs are very naughty on general principles, but they are very handy to help start up new mining camps and convert them into bonanzas.

Other Districts Waking Up.

South of Paradise—same range in Colconda district in the Eden mountains—are several promising claims held mostly by poor men, who do prospect work from year to year sufficient to hold till something will turn up to relieve them. The veins are generally large, carrying low-grade ores seldom over \$80 per ton, yet some of the smaller veins mill as high as \$200, as is the case with first-class Silver King ore. Not many claims are now worked; wood and water are scarce. Mr. Sadorus, Sr., owner of the "Credit Mobilier," is said to have a good mine tunnel in the 200 foot shaft down 71 feet. He has got some specimens of coarse gold, also fine gold. He has a small rotary battery. His claims are within the Paradise district boundary. Humboldt county will soon be as well known for her bullion yield as she now is for her great beef shipments.

B. W. CROWELL.

The New Copper Assay.

EDITORS PRESS:—I have just met with an illustration of the value of my new method of assaying copper, which may interest your readers.

I had a sample of ore to assay for silver and copper. Being somewhat pressed for time I made the assay for copper by the potassium cyanide method with newly prepared and titrated solution. This gave me 8.7 per cent copper, the assay passing perfectly. With a view rather to testing the new method than checking the assay, I tried the former. It gave me 1.7 per cent by a rather hurried operation. This great discrepancy led me to make a third assay by the Swedish method, which passed unusually well, the copper running down in a thin but compact sheet which separated well from the iron. I got 2.2 per cent copper, which, redissolved and titrated by the new method, gave 2.3 per cent. In this instance the operation was performed in too small quantities, only 50 ins. of copper being used for the titration. The zanthate solution used was a month old. I have since worked with stronger solutions, using one gramme of copper for titration, that quantity requiring about 200 cc of the zanthate solution. I have no hesitation in saying that, working in this way, the method is more exact than the hurried assay of silver bullion with the same weight of metal.

On examining the ore spoken of I found that it contained a considerable quantity of zinc, which doubtless caused the enormous result by the cyanide method. The zinc being in the state of oxide was not very apparent to the sight.

One great advantage of my method, besides its delicacy, is the facility with which the presence of nickel is detected, this metal frequently occurring with copper. It is only necessary to add acetic acid in excess to the ammoniacal solution from which the copper has been precipitated, and then a little more of the zanthate, unless it was previously used in excess. If a trace of nickel is present a yellow color is produced; if more than a trace, a yellow precipitate soluble in ammonia.

C. H. A.

January 31st, 1884.

Prescott, A. T.

The Volcanic Period Prior to Man's Creation.

EDITORS PRESS:—We have evidences, more particularly on the American Continent, of a period of extraordinary volcanic activity, of which the basin of the Pacific Ocean is the theater, that occurred in the latter tertiary. Since that time the earth has been comparatively quiet with occasional spasmodic actions, and the forces of nature have had twice to recuperate their strength.

This volcanic outburst occurred at a period subsequent to the formation of the deep placers, or what now are known as ancient river channels or "Dead rivers," in the Sierra Nevada mountains.

During that time the whole western slopes of the North American Continent, particularly that portion near the Pacific Ocean, must have been the scene of an intense volcanic activity of which we have unmistakable evidence in the upheaval of the coast range of mountains, the elevation of the Sierra Nevada, with the

summit studded with volcanic cones and its westerly slope with lava-covered beds of ancient river channels—valleys, which previous to the upheaval, were the bed of the ocean, filled for hundreds of miles in length and to a great depth with volcanic ashes, pumice, scoria and basaltic lavas. The usual phenomena accompanying violent and extensive volcanic outbursts doubtless were not wanting; the earth's surface undulating like a troubled sea; deep fissures and chasms opened in the solid rock through which molten lavas, thermal waters, sulphuric and mephitic vapors, electric and inflammable gases were constantly emitted; mountains rent in twain; rivers turned from their courses seeking new channels; lakes dried up, or their waters disappearing in yawning abysses which were opened to receive them; new lakes were formed, and the whole configuration of the country changed. The shores of the Pacific removed some sixty miles westerly, its hitherto placid waters maddened and tossed by violent earthquakes, receding, surging and foaming in mountain waves, striving to surmount the new barrier and regain its lost ground and familiar shores; torrents of water and much pouring down the mountain sides from successive rains; sudden melting of immense glaciers and mountains of snow from the fervid heat of the lava flow, inundating the country. It was a war of the elements—fire vs. water—each striving to obtain the mastery. There were doubtless unearthly, terrific and appalling noises; dense clouds of ashes and volcanic dust obscuring the sun; a red, lurid and unearthly light seen, and at intervals spasmodic volcanic eruptions, lighting up the whole country with a light so vivid and intense that the sun would have paled had it been visible. Huge masses of molten rocks, hundreds of tons in weight, were thrown high in the air, their surfaces contracting on meeting the cooler atmospheric air, and exploding with deafening reports, scattering their thousands of fragments of bright, glowing masses of fire in every direction—a pyrotechnic display shaming man's puny efforts. Streams of molten lava were running down the mountain sides with irresistible force and velocity, cutting down extensive forests of mammoth trees with less effort than the farmer exerts in mowing his grasses, in its onward and downward flow, melting down hills and filling valleys.

Under all this superficial disturbance lay the motor, the irresistible and invisible power that produced this effect—one vast sea of molten lava and generated gasses contracting and expanding under the immense pressure of the superincumbent mass. The earth's crust was like the waves of the sea, convulsed and tossed about by the expansive forces of its highly-heated and elastic gasses, struggling to escape from the rocky embrace. This wreck of matter and trash of worlds must have produced an indescribable effect, and one that "Dante, with all his vivid and descriptive powers, would have made but a feeble attempt to portray." Dore, with his wonderful pencil, would not have been equal to the task.

This terrible convulsion must have been preceded by premonitory symptoms, affording time for many of the then existing animals to escape from the mountain ranges, as these "dead" or "ancient river" channels are nearly destitute of animal remains. That animals existed in immense quantities and of mammoth proportions at that time and inhabited these densely wooded forests with which the mountain ranges were covered we have abundant proof, as their fossilized remains are found at numerous places in the lower foothills and deltas, while the lava covered auriferous channels of the dead rivers are filled with fossil trees and vegetation, with but few animal remains. The then existing animals undoubtedly rushed in terrified, frantic and countless herds to the plains, seeking the cooler atmosphere of the sea, but to meet a frightful and horrible death from which there was no escape. They were either overtaken and engulfed by streams of molten lava, floods of mud and water, or destroyed by mephitic vapors and poisonous gases that extended over the entire continent. Should they have been so fortunate as to have reached the sea, the incoming earthquake wave engulfed and destroyed the survivors, its under-tow sweeping their remains seaward, and they became a thing of the past.

XMAN.

ARSENIC.—Arsenic is widely disseminated throughout the ores of the Rocky mountains, occurring principally in combination with iron forming the mineral mispickel. In Gunnison county, Colorado, it occurs in combination with cobalt and iron, probably as the mineral lollingite. On the Pacific coast the mispickel is frequently auriferous, and is treated by the chlorination and leaching process for the extraction of its gold contents. Mispickel is also found, in more or less quantity, in almost every portion of the United States; and is often mistaken by farmers for silver ore. Large quantities of arsenic pass off in the fumes from roasting and smelting furnaces and are lost, no attempt being made to save the volatile elements in the ores. Arsenious acid occurs quite frequently in fragile crystals in the dust chambers of smelters, forming beautiful specimens for cabinets.

NEAR Halfmoon bay, while the farmers are plowing, numbers of sea-gulls follow the plow, and now and then they swoop down and catch a field mouse, and, with a twist, it is at once swallowed. In this way thousands of vermin are destroyed.

MECHANICAL PROGRESS.

Solid and Gaseous Fuel.

In view of the large amount of attention that is just now being directed to the comparative value of solid and gaseous fuel, the following, from *Le Gaz Belge*, will be read with interest:

When solid fuel is employed, it is not only necessary to provide the supply of oxygen required for combustion, but also to convey into the furnace sufficient air to drive off the products of that combustion, by ensuring the contact of the oxygen with the whole surface of the combustible material. In practice it is found that nearly twice the quantity of air theoretically required has to be provided, and this, of course, doubles the volume of the gases that have to be heated. It may thus be assumed that half of the air admitted into a furnace does not serve for combustion; and this excess of air naturally carries off a considerable quantity of heat. The loss, however, is a necessity, for if less air were supplied there would be a possibility of combustion being incomplete, and the evil would become greater. In fact, the carbon passing into the condition of carbonic acid (the result of the most complete combustion) develops 7,200 heat units, while with a less perfect transformation it furnishes carbonic oxide, giving only 1,400 units. When gaseous combustibles are utilized, these losses may be prevented, since very nearly the determined quantity of oxygen may be supplied, and this be caused to mix more closely with the combustible elements, without necessitating the expenditure, on the part of the mixture, of an amount of energy comparable with that required by the solid combustibles.

The commercial value of the two kinds of combustibles may be approximately stated as follows: Coals have, according to their quantity, a standard of from 4,500 to 7,500—say an average of 6,000—heat units. From this number must be deducted 500 heat units lost in effecting combustion. There remain, therefore, 5,500 heat units. Now the absolute available heat of furnaces employed for industrial purposes does not exceed 40 per cent of their theoretical heating capacity, and, therefore, effective calorific power is reduced to about 2,000 calories. The cost of furnace coal of average quality ranges from 6 to 8 francs per 1,000 kilos—say 0.8c per kilogramme (2.2 pounds). The 2,000 calories heating power therefore cost 0.8c. If coal gas is taken as the element of comparison, its yield in heat being 12,000 units of the net cost of 7 cents, the ratio becomes 1.4 for coal gas respectively. This, however, is exclusive of the cost of labor, maintenance of appliances, transport of fuel, etc., all of which would double the net cost of the solid combustible material, so that the proportion really becomes 2 for coal and 1.4 for gas. But the solid combustible furnishes only 2,000 calories, while if it is transformed into lighting gas it would furnish 3,000 calories. The final ratio of the net cost, therefore, become 3 for coal against 1.4 for gas. In other words, the employment of illuminating gas as a combustible is attended with about twice the economy that results from the use of ordinary coal.

Working Cold Wrought Iron.

Unless the iron is of small diameter, as wire, and makes a considerable circle in bending, it is usually believed that it should be heated to be worked. But if the wire is of tough iron it may be worked as closely when cold, if not as easily, as though heated. Familiar instances are the small articles known as "bright wire goods." These are staples, hooks, rings, screw eyes for picture frames, angle hooks, and many similar articles. Some of these undergo as square bending as would be possible if they were worked when red hot, as the angle hooks, which are either pointed to be driven or threaded to be screwed; the angle being perfectly square without the suggestion of a curve. These hooks are made in machine dies, and to form the elbow with a perfectly square turn the wire is actually upset cold at the bend. Other instances of the malleability of cold wrought iron are given in the heading of cut nails and iron rivets, but usually this sort of work is kept within narrow limits as to size of material. Yet a large tool-making establishment in New England has built a number of heading machines on foreign orders that made conical and flat heads on bars of iron three-quarters of an inch in diameter. These heads were as clean and as free from cracks or fraying as if formed from the red hot bar, and the projection of the head on each side was slightly less than one-quarter of an inch, making a head one and a quarter inches in diameter. The heading machine for such work as this must, of course, be of enormous strength to resist the blow and pressure that would upset a three-quarter inch bar to such an extent.

Wrought iron has another quality when cold—that of being welded—a quality that in some instances makes trouble, but in others is utilized. Where iron washers have been put in the stop of an upright shaft carrying a heavy wheel with a view of dividing the friction, they have sometimes become welded solidly, so thoroughly united that not even heating them would separate them. Harness rings of iron wire and others for hand hags are solidly welded when cold by placing the formed ring in a die a

trifle smaller in diameter than the ring, and bringing a corresponding die with great pressure on the ring, forcing the ends of the wire together.—*Scientific American*.

DYNAMITE FOR ARTILLERY USE.—The *Norwalk (Conn.) Hour* describes a device for throwing dynamite cartridges instead of balls or shells from cannon for destructive use. That paper says: On the floor of one of the rooms of the Norwalk Iron Works Company is a long, heavy cylinder. Its length is about twenty-eight feet, and the diameter of the bore is about four inches. In another department men are at work constructing an air compressor. When the latter is completed it will be connected with the tube mentioned above, and what the inventor confidently believes will be a most tremendous engine of war will be complete and ready for trial. Several years ago, while in Washington, a gentleman from Ohio heard a naval officer say that if a gun could be constructed that would throw dynamite it would thoroughly revolutionize modern warfare. Mr. Millin—that was the gentleman's name—proceeded at once to invent such a gun, and he has reason to believe that it will be a perfect success. It would not do to use powder as a propelling power, for its sudden action would explode the dynamite cartridge at the start and blow the gun to atoms. Compressed air, at a pressure of about 300 pounds to the square inch, will take the place of powder, and the gun now in South Norwalk is expected to throw a three pound cartridge a distance of two miles. Imagine the effect of a cartridge of even so small a weight striking the side or deck of a vessel, or the ramparts of a fort. The explosion would be terrible in its results. If the gun is a success, others of a size sufficient to throw 100 pounds of dynamite ten miles will be constructed. The gun, loaded with sand instead of dynamite, will be tested in South Norwalk at an early day, in the presence of naval officers, scientific men and others.

THE IMPORTANCE OF THE MECHANIC.—Each ensuing day, says the *Boston Commercial Bulletin*, makes more prominent the fact that we have come upon the time when the mechanic is master. We have crowded professions and ill-filled trades. A chance to fill the position of sub-assistant clerk in a wholesale house is eagerly grasped at by a hundred applicants, though the wages received be scarcely more than "a chance to learn the business." Let a master workman try to obtain an apprentice at three times the salary offered the clerk, and his applicants will be poor alike in quantity and quality. A skilled workman in any trade need never want for hire; he is eagerly sought after by a hundred employers; he is independent of the condition of the market; the skill and cunning of his hand and eye are too valuable to lose, and must be paid whether the products are slowly or rapidly consumed. If business ceases, the master hand is eagerly seized by some rival house, which knows and values the product of his skill. He who would crush down the obstacles to success in our own days must have, as well as the wit to see the crevice, the strength to deal the blow. This is an age of the steam engine, and it is the engineer, not the conductor, who is master.

A DIFFUSION ENGINE.—A curiosity in physics was exhibited by Mr. Woodward, lately, at the Physical Society, London, in the shape of what is veritably a diffusion engine; that is to say, a machine in which work is done by the diffusion of gases. The action of the engine is based on the experiment of the late Prof. Graham, the well known chemist. The experiment consists in taking a red clay porous cylinder containing air and covering it with an inverted bell-jar full of hydrogen. The hydrogen diffuses into the cylinder more quickly than the air diffuses out, as shown by means of a glass tube projecting from the bottom of the cylinder into a vessel of colored water. When the gaseous pressure inside the cylinder is increased by the influx of hydrogen, the mixed gases descend this tube and bubble out of the water. On removing the bell-jar the action ceases, and a reaction, due to fall of pressure, causes the water to rise in the tube. By suspending the gaseous cylinder of porous clay from a balance beam, and directing a jet of hydrogen gas against its side, the beam begins to oscillate and keeps plainly oscillating for a length of time, the action being sustained by the alternations of gaseous pressure in the cylinder.

NEW SPIKE.—A railroad spike has just been invented by Wm. H. Bailey, of Minneapolis. It is a common spike twisted to form a spiral, and it has a small spur at the point to facilitate its entrance into the tie. When driven, we believe it will hold like a screw; but if it turns in going inward it will be difficult to hit the head on to the lip of the rail.—*Lumberman's Gazette*.

A PROCESS FOR FROSTING GLASS.—To give glass this appearance, it is only necessary to coat it with the following composition: Sulphate of magnesia diluted in beer, with a little dextrine added.

AMERICAN CARS IN ENGLAND.—The Midland R. W. O. will hereafter build all its cars on the American model, and its Pullman cars for first-class passengers, without extra fare. The world moves.

SCIENTIFIC PROGRESS.

Origin of the California Coast Mountains.

Are they the Results of Glacial Action, and not of the Uphenavni?

Quite an interesting discussion occurred at a late meeting of the American Association for the Advancement of Science, respecting the geological changes which were brought about by the movement of ice during the glacial period.

Some of the members declared that they did not believe that glaciers have ever been an important geological agent, and that the phenomena usually ascribed to glacial action in the record of an ice period were generally due to icebergs. While, on the other hand, others asserted that during the glacial epoch heavy ice sheets covered most of the elevated portions of western North America, as far south as the 36th parallel of latitude; and that eastern North America was overspread with ice, which attained a depth of between 5,000 and 6,000 feet. This last declaration supports the views of Professor Hitchcock and others, who believe that the ice sheets of New England were able to move their debris over wide lands of little declivity towards the sea, their immense deposits forming the lands of Cape Cod, and also the large islands of Nantucket and Martha's Vineyard. Glacialists also maintain that even greater work has been performed by ice sheets in other countries.

Professor James Geikie stated in his discussion on the glacial deposits of northern Italy, that the deposits from Alpine ice sheets of a frigid period "rise out of the plains of Piedmont as steep hills to a height of 1,500 feet, and in one place to nearly 2,000 feet. Measured along its outer circumference this great moraine mass is found to have a frontage of 50 miles, while the plain which it incloses extends some 15 miles from Andrate southward."

Prompted by the above discussion, a correspondent of the *Scientific American*, Mr. C. A. M. Taber, of Wakefield, Mass., communicates to that paper the following views as to the work performed by glacial action on the Pacific coast. Notwithstanding Prof. Whitney and other geologists declare that the

California Coast Range of Mountains

Has been produced by great disturbances and upheavals within a comparatively recent geological period, Mr. Taber says that from his observations while traversing that region: "It appeared to me that the Coast Ranges originated in a different manner from the older Sierras. The western sides of the latter mountains everywhere showed the great eroding power of ancient glaciers; and when I consider their favorable position for the accumulation of snow during a glacial period I was led to seek for the glacial deposits adequate to represent the great gathering of ice which an age of frigid temperature would produce. But it seemed to me that such deposits could not be found in the foothills of the Sierras, which contain the moraine of inferior ice sheets that terminated at the base of the mountains. Under these considerations, I came to the conclusion that during the earlier ice periods the immense glaciers which formed on the western slopes of the Sierra Range moved their gigantic heaps of debris so far seaward as to form the range of hills now existing next to the coast line; the Contra Costa, or middle range, being formed during a subsequent ice period in the same manner as the hills next to the coast line. Still, it may be that neither of the Coast Ranges was the work of a single ice period, but the western range must necessarily have been the earliest deposit.

"Although the Sierras differ from the coast hills in composition, it does not disagree with the glacial origin of the latter region, from the fact that the ice sheets while moving their bulk westward displaced the deposits of such bays, lakes, rivers and marshes as lay abreast the Sierra slopes; the moving ice-sheets, thousands of feet in depth, pressed and plowed below the somewhat superficial Cretaceous and alluvial strata which lay in its course. The disturbed strata, while pushed along in confused heaps in front of the ice, were amassed in ridges sufficient to form the hills of the Coast Ranges. The boulders found imbedded in several of the coast hills must have been moved by ice from the Sierras, on account of the Coast Ranges not having a rocky core of sufficient firmness to give shape to such boulders. Moreover, the temperature of the Pacific waters would not be favorable for glaciers to form on the Coast Ranges with the ice-sheets of the Sierras terminating at the foothills.

"The Sacramento and San Joaquin valleys are now covered by recent river deposits, therefore the glacial drift which should be traced from the Sierras to the Coast Ranges is concealed. But the abraded appearance of exposed solid rock at the base of the foothills, and also the scattered boulders which gradually disappear beneath the diluvial deposits of the plains, indicate that the Sierra ice-sheets could not have ended at the foothills, but must have moved further westward while pushing immense accumulations of earth in their front.

"The Coast Ranges in several places have been subject to igneous action, which may have been brought about through heat generated from pressure exerted on the interior masses after the ice had melted away, the heat thus produced

being sufficient to cause outbursts of lava where the nature of the material favored combustion. The low plains, lakes and bays which separate the Sierras from the coast hills are in a position similar to the shallow sounds which separate Nantucket, Martha's Vineyard and Long Island from the inferior slopes of the mountains of New England. Therefore, while agreeing with glacialists who believe that great geological changes have been wrought by ice sheets in Italy and New England, it appears to me that the ancient glaciers of Sierra Nevada have accomplished far greater work, owing to the Sierras being situated in a more favorable position to receive and condense the humidity from the ocean. Hence, with a low temperature vast quantities of snow would gather on their lofty sides, and at the same time their longer range and greater declivity would cause the ice sheets to move down their steep slopes with greater force than the glaciers which passed over New England."

Astronomical.

A more than ordinary interest appears to be moving astronomers at the present time in scanning the heavens for new discoveries in stellar space, and in studying the surfaces of the bodies composing our solar system. Jupiter has been the principal center of interest for a year or two just past; but with the almost total disappearance of the "spot" which formed the chief object of interest, astronomers are looking in other directions for something new.

At a recent meeting of the Royal Astronomical Society, Mr. Raynard read a note on a narrow belt which he had seen on the planet Saturn. He said that he believed narrow belts similar to those seen upon Jupiter, were very rare. There were many observations of broad belts of a bluish-brown color upon the ball of the planet, but he was not aware of any other observation of a sharply defined narrow belt. While observing the planet on the evening of November 4th, with an 18-inch silver-on-glass reflector, he noticed a narrow, dark belt, which stretched across the disk, and at moments of good definition could be seen to fade away toward either limb; but he thought that the decrease in intensity was not as marked as in the case of similar belts upon Jupiter.

The color of the belt was a dark blue-gray, strikingly different from the reddish-brown of the belts upon Jupiter. On the 4th of November it was a striking object, nearly as easily seen as the Cassini division on the ring, though not so dark. He estimated its breadth as not double the breadth of the Cassini division, where it is seen broadest in the ansæ. The belt was again seen on the 13th of November, but was not then so conspicuous, and the definition was not as good as on the 4th.

On the 21st he saw it again, and it was also seen by Mr. Hopkins, who observed it with him. He had tried to find whether any other persons had seen it, and found that Dr. Copeland had, on the 6th of November, seen a dark belt, which he described as in about 20° south latitude, sharp toward the equator, and shading off toward the pole. He estimated its breadth at about twice that of the great division in the ring. It should be remarked that taking ten and a quarter hours as the rotation period of the planet, the opposite side of the ball would have been turned toward the earth at the time of Dr. Copeland's observation as compared with Mr. Raynard's observations of the 4th and 13th.

Perhaps the most interesting celestial event of the year is the opposition of Mars, just occurring as we write. The first physical features of the planet that come into view are the snow caps surrounding its poles. The southern pole is now inclined toward the earth, and a small telescope, say of three inches aperture, will plainly show the circular gleaming patch of snow that covers the Antarctic region of the globe of Mars. The dark ring surrounding the snow field, and sometimes called Phillip's sea, is almost equally distinct, and some of the other seas, or spots that are believed to be seas, can be seen with the same telescope. With a larger telescope more details are visible, as it would also be able to show the two tiny moons of Mars, which revolve close to the planet, so rapidly that the inner one goes through all the changes from new moon to old moon in less than a day. Another interesting thing about Mars which can now be studied is the mysterious network of so-called canals, which cover a large portion of the planet's surface, particularly in the equatorial regions. The idea that there are really canals constructed by inhabitants of the ruddy planet can be hardly entertained when it is known that they are sixty miles and more in width.

SOLIDIFIED BISULPHIDE OF CARBON.—According to M. Mercier, by mixing boiled linseed oil with 10 per cent. of protochloride of sulphur, a gelatinous mass is formed, and if a large quantity of bisulphide of carbon be simultaneously added, the whole sets into an elastic transparent jelly, very permanent in the air, and inflammable only with difficulty, although it may contain as much as 70 per cent. of bisulphide.

PROFESSOR NORDENSKJÖLD has presented a meteoric block, which he found with others in 1870 at Ovipak, on the Disco Peninsula, Greenland, to the Helsingfors University, where it has lately arrived from America, its weight being about 10,000 pounds. Nature says the block is to be kept out in the open air, as it has been discovered that these stones waste away in a room.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

RED CLOUD.—Amador *Register*, Feb. 6: This quartz claim is situated at the head of Murphy's gulch, and is owned by W. Moon and others. It is idle just now, but has been worked pretty steadily during the past four months. There is a large ledge, some say 20 ft wide, between the walls; about three ft of it is of dark streak quartz, carrying considerable sulphurets, and showing freely in coarse gold. There is a quantity of ore on the dump, and the late heavy rains this week washed the ore, and made it an easy task to pick up specimens rich in free gold.

STRIKE IN THE MAMMOTH.—Toward the latter part of last week another strike of rich ore was made in the now famous Mammoth mine at Middle Bar. The work that has been prosecuted with all possible speed, has been the running of the upper tunnel, to make connection with the shaft. This tunnel now lacks nearly 150 ft of the desired point. In pushing this tunnel, a vein of "black metal," freighted with a bountiful proportion of free gold, was encountered. It is identical in character with the ore heretofore met with in other portions of the mine. What makes this discovery so significant is the fact that it is several hundred ft distant from the point where the first strike was made, and also deeper by over 100 ft. It is regarded as very probably that it is the same vein, and in this view the mine is staggered at the vastness of the golden wall, as it were, that nature has built here. The ore is estimated to be worth \$10,000 per ton, at a rough guess. A considerable quantity was taken out in the prosecution of the tunnel, but beyond this the lead was not disturbed, and will not be worked until the tunnel reaches its objective point.

JULIAN.—This mine has been at a standstill for two or three weeks, as far as the taking out of ore is concerned. Arrangements have been made to have the ore already out crushed at the Nevills' mill. There is about 10 tons of milling ore already out, and the work of taking out about as much more already in sight will be commenced to-day. The future method of working will be governed in a great measure by the result of the crushing. There is no question that the rock will pay big, but the best method of treating this class of ores is the question to be determined.

MISCELLANEOUS.—The big tunnel at Middle Bar is making headway at the rate of about eight ft per day.

Calaveras.

SOLD.—*Mountain Echo*, Feb. 2: F. Johnson & Co. recently sold their quartz mine, situated near this town, to a San Francisco party, who intends to commence working the mine as soon as convenient. Mr. Charles Smith, Supt. of the Fair Play mine, has been placed in charge of the new enterprise. The price paid for the mine has not been made public. The new stamp mill on the Morgan mine has been running about a week and works well. It crushes an average of 21 tons of ore in 24 hours.

Los Angeles.

GRAPHITE.—*Los Angeles Miner*, Feb. 2: About one month ago an important discovery was made by Samuel Carson, on his land at Tejuca, about twenty-five miles from this city. The peculiar character of the mineral attracted his attention, and upon investigation it was found to be graphite of a superior quality. Specimens were brought to town, and resulted in A. W. Potts, A. M. Reed and Wm. Osborn becoming interested in the mine, and work actually proceeded with. A tunnel is being run so as to cut the ledge, and the results so far produced are beyond the most sanguine expectations of the owners. The ledge is estimated to be forty-two ft wide, and can be traced a considerable length by the croppings. The mineral is taken out in an almost pure state, is easily worked, and is destined to be in considerable demand as soon as its merits are brought to the attention of manufacturers. Mr. Potts sent a specimen to Dallas, Texas, and an answer in reply stated that it was the best article of graphite that had ever been received at the factory there. It is the intention of the owners to send a huge specimen to Faber & Co., the great manufacturers of lead pencils, and if the article is what it is supposed to be, and is considered favorably by that firm, regular shipments will be made to them. The mine is only twelve miles from the railroad, and will, in the course of time, prove to be a great property.

Mariposa.

CRANBERRY AND RUTHERFORD MINES.—*Mariposa Gazette*, Feb. 2: The latest news from these mines, which are situated on the north side of the Main Merced river, near the old Ferguson mine, is, that under the management of S. W. Cruique, one of the owners, a large amount of fine rock has been taken from the Cranberry, and that a drift is being run through excellent ore on the seventy foot level. Two adrastra, by water-power, have been running since January 1st, with excellent results. These mines are within two miles of the Hite and Ferguson, and seem likely to rival any of the celebrated mines in that vicinity. With the exception of an early prospect shaft sunk some 30 or 40 ft, quite a number of years ago, the Cranberry is a new mine, now developing under the most favorable auspices. The vein is a true fissure, about three feet thick and the rock well diffused with sulphurets and free gold. The vein is so favorably located on the mountain side, fronting the river, that a backing of 1,500 or 2,000 ft could be obtained by means of a tunnel, run from the base of the mountain, which would probably be some two or three thousand ft in length. It also has the advantage of a water-power second to no other in the mineral region of California.

DILTZ MINE.—The recent copious rain and snow will afford Captain Diltz a most favorable opportunity for a season's wash of a vast accumulation of gold-bearing dirt and decomposed vein matter, which he had piled up at the head of his sluices ready for washing.

THE SHROEDER MINE, same as the Diltz mine, with the exception of a hydraulic system, which it has constructed upon the claim, will enjoy the harvest of a rainy season, giving wealth to its indus-

trious owner, Mr. Shroeder, which is doubly assured from a knowledge obtained from its previous workings.

THE BUENA VISTA MINE, by the O'Gorman brothers, which is a new enterprise, met with a cause of delay one day last week, by the breaking of some portion of the engine which had to be shipped from below, also with some irregularities of the pump. At last accounts, all necessary repairs had been made, and crushing of ore is vigorously going ahead again.

Mono.

BODIE.—*Free Press*, Feb. 1: The present outlook is most encouraging, notwithstanding what prejudiced outsiders have to say. It has been shown in a solid way that this district has wonderful vitality, and that it can keep to the front vigorously in spite of all efforts to cough it down. The Standard has been the backbone—as reliable a mine as there is on the continent. The sterling worth of the Bodie Con. no one in a sensible mood can doubt. The Champion has got to work again. The Bodie tunnel makes a fine showing; the Syndicate is turning out enough bullion to make a good camp elsewhere; the Goodshaw is alive again; the Mono is full of promise, and with other mines that will commence work soon, we have indications of a prosperous season in Bodie.

STANDARD CON.—Extracted and shipped to the mills 1411 tons of ore; received 2351 ounces of crude bullion, and shipped to the company \$17,035.33. Winze from north drift No. 2, 385 level, is down 46 ft; progress 8 ft. The vein here is four ft wide. There is no change to note in the appearance of the stipes.

BODIE CON.—During the week ending January 29th, 149 tons of ore were shipped to the mill and 140 tons milled. This ore was extracted from the 600 and 780 levels and 15 carloads from the 306 level. Since last report they have been cleaning out and retimbering the Burgess south drift from the west crosscut, 306 level, in order to further prospect the vein to the southward. During the week they have been making some changes in the mill by speeding the pans from 45 to 60 revolutions, changing the system of amalgamation, etc.

GOODSHAW.—During the past week they have been overhauling the machinery of the hoisting works, and will be ready to resume operations in the mine the latter part of the present week unless further delayed by the heavy snow-storm, which may prevent obtaining a supply of water for the boilers until after the weather clears off.

BODIE TUNNEL.—The mill started up Thursday afternoon of last week and is now running smoothly. Considerable delay in starting the mill was occasioned by being obliged to dig up frozen water pipes connected with the tanks and machinery of the mill, and in consequence but little work was done in the mine.

THE CHAMPION.—Superintendent White has some men making preparations for effective work, and in a few days a good force will be employed. The machinery at the hoisting works is being overhauled and everything put in good order.

BULWER CON.—The north drift, 700 level, has been run during the week seven ft; total length 548 ft.

SYNDICATE.—The mill is running steadily and making good returns, with plenty of ore for an indefinite period.

TUNNEL.—*Homer Mining Index*, Feb. 2: The tunnel in the Isabella Mayes mine, west of the Homer, has been driven 200 ft, cutting several promising veins, and Messrs. William Mayes and others are now engaged in breasting out ore from an 8-foot vein 80 feet in from the mouth of the tunnel, having the assurance of a mill in the spring of capacity equal to the supply of ore in the mine. The snow storm has somewhat retarded mining operations this week, but most of those engaged in developing their own properties have kept steadily at work. In the Mariposa-Coyote, on Copper Creek, Jordan District, the working force has been transferred from the shaft to the tunnel. We have no intelligence from the Great Sierra tunnel, Tioga District, but it is believed that the Sheepherder lode will be reached in a week or two. The final shipment for the season of May Lundy bullion was made on Tuesday last.

Plumas.

FRENCH RAVINE.—*Plumas National*, Jan. 26: A report came from Rich Bar on Wednesday that the tunnel being driven by the French Ravine Co. had broken into the ledge, and that a four-foot vein of decomposed ore had been exposed, in which free gold could be seen.

LUCKY S.—One of the National force took a trip last week to the Lucky S. mine, in Emerald district, and his glowing description of the outlook would convince almost anyone that the veritable "bonanza" had been found. The houses, sheds, dump-house, tramway, &c., &c., are in good shape, and everything is put together with a view to successfully withstand the winter storms and snows. Much work has been done for the time spent there, and evidently to the best advantage. The main point of interest, however, is in the tunnel, which a short time ago tapped the No. 2 ledge at a depth of 110 ft, the tunnel being 190 ft long. The ledge shows splendidly; at the top of the tunnel it is four ft thick and at the bottom the whole tunnel is in quartz. The hanging wall, which it shows, is smooth as a board, showing that the vein is a true one. The rock is rich, free gold showing all over the face of the tunnel, and horn prospects giving evidence that it will pay richly. Experts put it at from \$15 to \$50 per ton. Eighty tons of rock are now piled up at the dump-house, and much more will be added to it during the winter.

San Bernardino.

PROVIDENCE MINES.—*Cor. Calico Print*, Feb. 2: The Bonanza King Co. is running with wonderful regularity. So far the company have taken nothing from their dumps. The assay value of their dump at present cannot fall much short of \$500,000. Although the company keeps their business very close, I am reliably informed that the lower level (fourth) is in fine ore of the highest grade. The mill, under the Superintendency of Mr. E. Huhn, is running constantly. Mr. Huhn has shown that he is the most thorough mill-man and metallurgist of the State by the working of ores of this camp up to so high a percentage.

A RICH STRIKE has been made by R. P. Kerr on his Perseverance mine about 1500 ft north of the Bon-

anza King extension. Mr. Kerr has been rewarded by cross cutting from the bottom of his shaft (forty ft deep) with a ten foot ledge and has not yet run through it. It carries considerable ore of the same nature of the Bonanza King and is likely to be a rival of his neighbor.

NEW MINING CO.—W. B. Caldwell & Co. have purchased a half interest in six mining claims, three on the north and east of the Bonanza King, and three on the west and south of the Bonanza King. The claims all show rich mineral. Mr. Caldwell is associated with mining men of experience and capital and is an old time prospector. I understand the new company formed will be called after the famous diamond of the Queen of England, the second largest diamond in the world.

THE KOHINOOR CON. MINING CO. has already put men to work and has struck a nice body of ore. It would seem that the contact north of the Bonanza King is going to turn out a large quantity of mineral wealth. Mr. Kerr's mine, still further north, is a highly flattered prospect, and there is little or any doubt but the Kohinoor Co. will be another Bonanza King.

THE BELL MCGILLROY MINE has had some ten tons of ore run through the Bonanza King mill during the past week, the working test showing that the owners, Dwyer & Gorman, have a good mine, although I don't speak by authority, but understand that it went \$135 per ton with very little assorting by the owners.

Shasta.

QUARTZ.—*Shasta Courier*, Feb. 2: The White mine of Lower Springs is showing up finely. The ledge is three feet wide and has a shaft sixty feet deep. Last year considerable of the quartz was taken out and worked in Waugh's arastra but the pay obtained was not very satisfactory, as the rock when assayed indicated that it could be worked to a much higher per cent by more improved process. Last week Mr. White took out a ten pound chunk of quartz from the body of the ledge, which, crushed in a hand mortar, yielded \$156. Twenty tons of ore is now being taken out to be worked in Kempton's Cannon Ball mill at Salt Creek, and the result will tell what the average rock of the mine will produce.

Sierra.

CLEAN UP.—*Mountain Messenger*, Jan. 26: The Bald Mt. Extension clean up last Sunday was 104 ounces and 1½ pennyweights—55 ounces and 1½ pennyweights from the washing of 311 carloads of gravel, averaging over \$3.29 per carload, in the small dump; and 49 ounces from the large one.

Siskiyou.

INDIAN CREEK.—*Cor. Yreka Union*, Jan. 30: Our prospects at present are favorable for a good mining season. Hydraulic miners are quite elated at the fine prospects for water, as the snow at present is some eight inches in depth on a level. No doubt we have stored on Scotts mountain at present four or five feet, where we draw our supply from in late seasons. In the way of quartz mining there is but little doing. Geo. Baker, the energetic miner, is driving his tunnel to tap the extension of the Grizzly mine with favorable prospects of soon striking the same. He has at present a tunnel some 400 ft in the mountain. Bailey & Co. shut down their mill about the 15th of Dec. owing to frozen roads and snow, which made it impossible to haul the quartz from the mine to the mill. They still keep a small force of miners getting out quartz ready for the spring to open. Their ledge is looking well, with plenty of rock in sight. Hart & Brown are busy driving a tunnel on the Siskiyou mine, on French gulch, which they expect to complete about the first of April. They expect to cut the ledge at a depth of 65 feet, they having already sunk a shaft to the depth of 49 feet, with fine prospects. I think next season we will see many ledges developed in this district. Sorenson, of New York gulch, is driving tunnels preparatory to taking out rock in the spring. He has fine prospects.

Trinity.

BULLY CHOOP.—*Cor. Examiner*, Feb. 2: Bully Choop mining district, is located in Trinity county on the western slope of the mountain of that name, just west of the boundary line between Shasta and Trinity counties, and about thirty-five miles northwest of the town of Anderson, in Shasta county. A company has recently been organized, consolidating the Foster, Susie and Cumberland mines under the name of the Cumberland Consolidated, with a capital stock of \$100,000, divided into an equal number of shares. It is the intention of the company to procure all necessary machinery for working the ore in the spring. A tunnel has been run in 228 ft. near the northern end of the Cumberland mine, the inner end being 141 ft below the surface. The ledge has prospected well and has been widening the entire distance, until now it shows a face of 24 ft. The last assay made showed \$12.56 in gold and \$1.56 in silver. All the ledges in the district are situated from 5000 to 6000 ft above sea level, any of which can be drained to a depth of 800 ft by running half as much farther. The greatest drawback to the camp has been the absence of suitable machinery for successfully working the ore. There are several small water-power mills with a capacity of about a ton per day, but, owing to imperfections, only the coarsest gold is saved—all the fine gold, which forms a large percentage of the whole, and the sulphurets going to waste. Heretofore everything had to be packed in and out of the mines on the backs of mules for a distance of ten miles over a very rough trail, but a charter has been granted and a company organized to construct a wagon road from the present terminus to the mines. Work will be commenced as early in the spring as the weather will permit, and the road completed as speedily as possible.

Tuolumne.

RICH.—*Tuolumne Independent*, Feb. 1: We have heard, from reliable authority, that Kenna & Hastings have, within a few days, struck it rich near the Arnold road, on the west side of the mountain. A cool thousand in a day is not hard to take.

LAMPHEAR.—The "Lamphear" mine, supposed to be there plenty more in the same neighborhood. There is the other end of the famous "Confidence" in the Sugar Pine mining district, is fairly beating the expectations of Mr. Chute, one of the principal owners, and at present manager, in the temporary absence of Mr. Johnnie Davis. We have time only for a passing notice of this wonderful ledge—several millions hav-

ing been taken out of the old Confidence adjoining, in a chute very similar. At the point of development under present notice, the vein is 4½ feet wide; the rich pay streak is 10 inches, carrying galena, sulphurets and coarse gold thickly intermixed. The sulphurets assay \$250 per ton. In fact the entire vein is good, and is thought will average \$200 per ton. The shaft has reached a depth of 240 feet. The ore we have seen from the north drift is extremely beautiful. The new hoisting works are 80 feet long and 30 feet wide.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Virginia Enterprise*, Feb. 2: The upraise from the main north drift on the 2900 will reach the 2700 level in about 10 days. This connection will so change the draft and give such a circulation of air as will permit of the prospecting of several streaks of ore known to exist in the mine to the northward. On the 3100 level the northeast drift is being advanced as rapidly as possible. The drift has passed over the ore streak reported last week, but the face is again in streaks of quartz of the same character. There are other ore streaks passed through in the joint Union Con. crosscut that are liable to be cut by this drift to the northeast. Some of the streaks are rich in gold.

ALTA.—There has been some delay of the work in the main east drift on the 2150 level, on account of it becoming necessary to make some repairs to the shaft, between the 1750 and the 1950 level.

SAVAGE.—The work of extending the main drift northward from the south line, on the 2600 level, has been resumed. This drift will be advanced into new and wholly unexplored ground. The joint crosscuts on the Hale and Norcross line—though extended but a short distance east and west—showing good quartz streaks going north into the Savage ground.

BEST AND BELCHER.—The ground in the bottom of the joint Gould and Curry winze below the 2500 level is still very soft, and requires close watching and close timbering.

MEXICAN.—General repairs are being made in all the levels from the 2500 down to the 3100, and when the connection in the Union Con. is made—which will be within three weeks—and a good supply of air obtained prospecting will be commenced at several points, both on the 2900 and 3100 levels.

COMBINATION SHAFT.—The new hydraulic pump, the air compressor, and all the other machinery, is now doing excellent work. Sinking for the 3000 level has been resumed, and the shaft will be pushed down to that point without delay.

HALE AND NORCROSS.—Good progress is being made in the sinking of the winze below the 2800 level. As soon as it has attained a depth suitable for a sump, a station will be opened and prospecting commenced at the 2800 level.

GOULD AND CURRY.—The joint Best and Belcher winze below the 2300 level is in soft ground that requires close timbering.

ORISKANY.—On the 150 level they are still extracting a considerable amount of ore, and besides are doing a great deal of prospecting.

CROWN POINT.—As the late storm will undoubtedly result in a good stage of water in the Carson river, allowing the mills to run up to their full capacity, we shall soon see a full force of men engaged in the extraction of ore from the mine.

UTAH.—On the 1750 level the northeast drift is making rapid progress in quartz that is beginning to give very promising assays.

UNION CON.—The connection will be made between the main north and south drifts on the 3100 level within three weeks.

YELLOW JACKET.—They will now doubtless soon be able to put on a full force of men, as the late storm can hardly fail of bringing the water in the Carson river up to a good milling stage.

CON. VIRGINIA.—The joint California winze below the 2700 level is being sunk and timbered at the rate of from 10 to 15 ft per week. It will reach the 2900 level in about 10 days.

CALIFORNIA.—On the 1700 level the joint Con. Virginia winze is making the usual progress in fair working ground. It will reach the 2900 level in about 10 days.

Bullion District.

THE MINES.—*Battle Mountain Messenger*, Jan. 30: The Lady of the Lake mine never looked better, and Mr. Robertson, the Supt., is endeavoring to have the company start up the works with a full force of men, but it seems that Messrs. Frisbie & Radovich do not see the necessity of this step. There are no less than 100 tons of first-class ore on the dump, and thousands in sight in the mine, of the richest ore that has ever been seen in the camp; yet it does not seem to me that the proper process to reduce the ore has been adopted. The same is also true of the ore from a majority of the mines in this district. Messrs. Blossom and Dunn, the owners of the Lady Don, are lying back awaiting further developments in other contiguous properties, knowing that the ledge from which so much good ore has been extracted and where the quantities are now in sight, is the extension of their ledge. The Leopard, the Lady of the Lake western extension, was jumped, but the Ross brothers, of Beowawe, who own it, repaired to the ground, and proving that it was not jumpable, regained possession of it. Paul and McKittrick have struck it rich, and have brought in some of the richest ore yet found in the district.

Hot Springs District.

WOODRUFF.—*Cor. Esmeralda Herald*, Feb. 2: I promised you a few items on my arrival at this place—Hot Springs mining district—but found the place so quiet, I thought it best to look around and take items before writing to you. We have a pony mail which arrives and departs to and from this place once a week. This district is in a basin or desert, surrounded on all sides by high mountain ranges. On the flat or desert is to be found acres upon acres of fine soda and borax ground. Several claims or locations have been taken up in borax and soda and also salt, and dotted here and there with monuments of location. I can also add that many acres still remain unlocated, as good as yet found for borax as well as soda. Water can be found at a depth of from fifteen to twenty-five ft, by sinking

anywhere along the flat. The basin is about twelve miles in length, by eight miles in width. Very little is being done at present by the owners of the salt, soda and borax locations, beyond keeping up the assessment work. The Great Eastern mine, owned and worked by Nick Perceval, is a fine piece of property, showing several tons of high grade ore on the dump, and hundreds of tons could be extracted from the tunnels, drifts and stopes. This mine is well opened and cannot fail to bring in time, a stake to its owner. The Eagle series of mines, number One, Two and Three, are three distinct parallel ledges, and are situated on Antelope mountain. These mines are also well developed and have had a great deal of work done in them in tunnels, drifts, stopes and shafts, exposing to view large bodies of good ore. A Woodruff has four men at the Eagle number One, taking out ore. He has run a drift south, thirty ft on the ledge from the bottom of the main shaft, showing a solid vein of quartz eighteen inches in width, assaying from \$50 to \$120 in gold, and \$2 to \$5 per ton in silver. The ledge is encased in white porphyry. True foot and hanging walls three ft apart. They have now about twenty-five tons of good milling ore on the dump, and are taking out a ton to the mill on each shift. Eagle number One and Three are principally gold, while number Two is mostly silver, averaging \$30 to \$60 per ton.

Columbus District.

THE COLUMBUS CON.—*Time Pressure*, Feb. 3: The main shaft has attained a depth of 75 feet below the station of the third level. The bottom of the shaft is now in vein matter, some of which gives fair assays. The drift from the shaft, on the third level, was extended about 8 feet during the week, making a total length of about 48 feet. The rock in this drift still continues to be very hard, although it has lately changed somewhat in character. The drift from the bottom of the Bonanza winze, running to connect with the shaft on the third level, has been extended 6 feet, making a total length of about 95 feet. The face of the same still continues in broken up vein matter that yields fair assays at times. The crosscut running south from the lateral drift on the 150 foot level has attained a length of about 95 feet. Since the date of the last report there has been no material change in the rock encountered in extending this crosscut. The appearance on the first level remains about the same as when last reported.

Highland District.

IN THE FRONT.—*Pioche Record*, Feb. 2: Highland is steadily coming to the front. While some men working in the upper level of the Mendha mine were engaged in running a crosscut they run into the old ledge, which had been lost for years. Long ago there was a drift run 300 feet for the purpose of finding this ledge, but it was never found. There are now employed a force of men in this mine nearly equal to that at the Day. The usual quantity of ore is being taken and shipped to the furnace daily. Prospecting work is being carried on at the old Hamburg, and day and night shifts are being worked. On Wednesday the men engaged in running a crosscut in the opposite direction from the ore recently struck, encountered a vein of fine appearing ore.

Patterson District.

THE PATTERSON STRIKE.—*Eureka Sentinel*, Feb. 2: Arthur Matheson, who arrived last night from Hamilton, says that he visited Patterson District a few days ago, and was disappointed in finding the ore strike recently made there not as big as at first represented. Yet, for all this, it is a good paying prospect. The ledge, which is quartz with rich chloride all through it, is six feet thick, and it has been stripped for a distance of 20 feet, paying more than wages all the way. From a chunk containing about four cubic feet of ore he took what he thought was a good, average sample, determined not to be fooled by selecting the best. The sample assayed \$94. Some of the rock assays from \$1,200 to \$1,500. The ledge dips at an angle of about 30 degrees, having a hanging wall of clay shale. There is another ledge about 75 feet distant which dips toward it, and may prove to be an offshoot from the main body. No greater depth than six feet has been attained. Very little snow has fallen in that locality this winter, so the ledge will be prospected only on or near the surface, until a rich chute is encountered, which it will be thought advisable to sink on. At present the mine is paying small dividends, with which the owners are well satisfied.

Pinto District.

FUTURE PROSPECTS.—*Cor. Eureka Sentinel*, Jan. 30: This, like a great many mining camps in Nevada, has suffered considerably from lack of enterprise and misrepresentation. Silverado is the most favorable looking country for mineral I have seen in Nevada. There are several good mines here which by systematic work, economical and judicious management, would yield a magnificent interest on capital. The Queen mine, owned by the Jones Bros., is a splendid property, but the owners are poor men and have not the means to develop it. The Silverado mine is also a fine property, but it requires capital to develop it. The Maryland, Silver Nugget, Fairplay and several other mines in the district, could be made good paying properties by the liberal investment of capital. The formation seems to be granulated and fossiliferous lime, shale and quartzite, with occasional fragments of the metamorphic and volcanic rocks. The character of the ore is chloride, bromide, Stedefeldite, copper, silver glance, argenteriferous galena and oxide of lead. There is no work being done on any of the mines for wages. There are a number of men prospecting, and some are gathering a good many shells. The weather, with the exception of a few cold days, has been delightful for the past month, but from present indications we are going to have it rough, and that pretty soon.

Safford District.

TUNNELS.—*Cor. Eureka Sentinel*, Jan. 30: The Onondaga tunnel is being run on contract by Howes & Doherty, and nothing will be done until connection is made with the shaft. The Zanola tunnel has nearly reached the bottom of the shaft. They think a few hours more will finish the work, when they will probably commence taking out ore from the lowest point of the development. Dan and Tom Shields are taking out some high grade ore from a claim called the General Shields, formerly the Franklin. Several tons are already sacked, which, they feel confident, will pay to ship to Salt Lake. Their mine adjoins the Illinois.

Sherman District.

AN OPEN FIELD.—*Nevada State Journal*, Feb. 2: The discovery of what is believed to be valuable mines in Sherman district, on what is to all appearance a continuation of the Comstock lode, has called to mind the fact that years ago rich ore was found in the mountains north of the Truckee river, between Reno and Wadsworth, and there are several old timers in Reno who are familiar with the locality who will go there as soon as the weather will permit and try, if possible, to spy out the place where the famous lode crosses the Truckee. It would not be at all strange that within the next few years bullion producing mines should be found all along that range of mountains from Virginia City to Pyramid Lake.

MAGENTA MINE.—*Glass Valley Union*, Feb. 1: Seven small loads of rock taken from the Magenta shaft have been cleaned up this week and gave a return of \$21 per load without including sulphurates. Rock is now being taken out of the prospect shafts on the croppings at seven different points, and shafts Nos. 2 and 3 are turning out rich rock, which it is expected will yield fully up to a previous crushing which went to \$120 per load. The big head of water which was struck on the 400 level a week ago is now under control and the water pumped out to the bottom of the shaft. An eight inch pump has been fitted up to be put in the shaft to avoid any detention from a similar cause in the future. In addition to this a hoisting engine is to be set up to raise the quartz, as it is the intention to put to work a larger force of men to extract quartz from the levels and stopes that are now opened in the mine.

SITU' DOWN.—Work was suspended at the Idaho mine yesterday owing to a break in the South Yuba Canal, which supplies the water power for running the hoisting and milling machinery of the mine. Repairs will be completed to-day and regular operations are expected to be resumed to-night. As the pumping is done by steam power no inconvenience will be occasioned by the break as to this part of the machinery.

ARIZONA.

NOTES.—*Prescott Courier*, Feb. 1: Chloriders are shipping rich ore to Benson, from Humburg district. Jim Lane's mine, near the Tiger, is yielding ore which pays to ship. The Black Warrior is in good condition. Superintendent Eaman says he has a great deal of fresh ground in which to stope, so that sinking is not necessary. The Peck people have their men drifting towards the Occident. Silver Belt continues to send down ore to Benson. Turkey creek miners are taking out ore. B. T. Riggs, who has worked in mines for thirty years, has just looked at the Kimball and Gold Block mines on Lynx creek, eight miles east of Prescott, and thinks well of them. Mr. Clark, on Groom creek, is working his mines and running his small reduction works. We hear that everything is satisfactory over there. An expert has been examining Charley Rush's mine and likes it. J. C. Herndon showed him the property. Mr. Tracy and other placer miners tell us that they have water in abundance for sluicing. The Dosoris company lately made another large shipment of choice ore to Pueblo. The experts who are coming from New York to look at C. C. Bean's copper fields, are expected here some day this week. It is not likely that the Howell company will do much until spring. United Verde company are still struggling with the transportation question. It is hard for them to get bullion in and coke out.

GOLD MINES.—*Prescott Courier*, Feb. 1: Mines now being worked by G. W. Curtis and others, near Lynx creek, eight miles east of Prescott, are the Kimball and Gold Block. The former is pierced by shaft to a depth of 150 ft. The vein is 4½ ft wide; the walls are perfect. We have seen a great deal of rock from this mine. It is gold bearing. Mr. Curtis will be pleased to exhibit about 300 tons of it. Indeed we have his word to the effect that there are, on the dump, four hundred tons of it. The rock is certainly very rich, free gold is everywhere to be seen, and we judge the ledge to be worth a fortune. The Gold Block is about four ft wide. It, too, has the reputation of being rich. A good wagon road runs by these mines and the trip from Prescott is easily and comfortably made by wagon. Mr. Curtis and partners are negotiating for a mill to work their ores. They are, meantime, sinking, drifting and enlarging the dump piles. Were these mines in some desert spot, near the S. P. railroad, they would cause a regular Quijotoa excitement. Here, but little is said concerning them, although they are almost within rifle shot of Prescott.

COLORADO.

GENERAL NOTES.—*Colorado Miner*, Jan. 26: Since our last statement the Bismarck has continued to show up mineral, and considerable was shipped from the mine during the past week. Conway & Co. brought down several tons of good ore from the Little Emma during the week. It ran in one class over 500 ounces to the ton. The Corry City continues to look up and a large quantity of ore, some of it milling over 200 ounces, is being taken from the development workings alone. The new machinery was started up last week. Henry Mears & Co. have started in to work the Lucky, the Lucky Extension, Emma, Hidden Treasure and Silver Quartz lodes, a group of claims on the north slope of Democrat mountain, whose surface workings already show up well. We are informed that the Moline Tunnel company will resume work in their tunnel about the first of next month. Blais and Morrison are working four men on the Albany lode on Fall river. The Albany is as yet only a prospect, the shaft being down only 35 ft. There is some ore in it, however, and the owners think very highly of the claim. The same parties are working eight men on the Grand View lode, on Republican mountain, which continues to improve steadily. A large quantity of ore is being taken out, and during the week a trail has graded to the mine, so that transportation can be made easy.

MARION.—The Marion, or Sherman mountain, almost on the line of the Seven-Thirty wagon road, is now being worked by H. E. and G. W. Hollenback and Ed. M. Clemans, who are both sinking and drifting. They have a small body of ore in sight.

ALABAMA.—The Alabama is one of the Equator group of mines, and is worked through the main Equator tunnel. About 600 ft from the mouth of the tunnel a drift has been run both east and west

on the Alabama vein. On the east this drift extends 350 ft, and about 150 ft back from the breast is a 100-

SONORA.—Egan, Conway & Co., who are working the Sonora, a few days since encountered a large body of quartz, with scattered mineral, in the lower drift, which is now in about 270 ft. The extent and value of the find cannot yet be determined.

foot stope, which has now been raised about 75 ft. Dean & Co. opened up a few days since the streak of ore, probably five inches wide, about which there has been so much talk. The ore is decomposed galena and gray copper and is very rich.

VICE-PRESIDENT.—Six men are at work on the Vice-President. In the breast of the drift, which is now in 300 ft, some ore is exposed. Though not much in quantity, it is of excellent quality, and the lessee is going to stay with it. In the stope on the same level, but some distance from the breast, they are at work on a large body of 80 ounce ore.

IDAHO.

BEARING THE COLOR D'ALENE.—*Cor. Salt Lake Tribune*: Our estimable deputy sheriff, Mr. Ed. F. Winn, of Oneida county, was called north by a telegram from your section of the country, on official business. In Mr. Winn's trip north he gave a close objective eye to the new excitement in the Color d'Alene, and as his views of such matters are considered sound by all that know him, I herewith take pleasure in giving them publicity. Mr. Winn's visit to the capital of the Color d'Alene, Eagle City, was very transitory, and of course he formed his ideas rapidly and gives expression to them deliberately. Mr. Winn is one of those gentlemen who look upon such affairs as the Color d'Alene, from purely a business, or rather commercial, standpoint and sees everything from his position void of excitement, consequently his views command a very large consideration. Without the conventional form of a regular interview, I will give you his observations. He left the Northern Pacific Railroad at Trout Creek Station, and for a distance of 26 miles traveled on foot over a narrow trail—a kind of towpath—to Eagle City. Upon arriving at Eagle City he found the town was built of three-fourths tents, the remainder being log cabins. A population of some 400 persons occupy these tenements. The miners showed him some nice coarse gold; saw one nugget that was reputed to weigh 572. All the gold is on bed rock; saw gold quartz reputed to have been found in the district as good as any he ever saw; cannot tell the extent of the country for placers. The miners are very reticent in their answers to queries, causing a suspicion that there is a "screw loose." A survey is being made from Heron Siding to the mines for a railroad track. There is a rumor of a shorter route by the way of Belnap, further south. Everybody going in seems to be prepossessed in favor of the saloon or restaurant business. "The fact is that the whole thing is one of the biggest sells that was ever gotten up, or it is a big thing." Though I am satisfied that he discovers now opened up do not justify the tremendous excitement that seems to pervade the country. Now, sir, taking Mr. Winn's dispassionate view of this Color d'Alene country, while on his transient and official business, I cannot see the animus of the craze that seems to have seized to whole mining world. There has never yet been given a report from that country that justifies the rush that is reported to be going there, and until something more than two or three holes sunk on Pritchard creek is developed up, I think the excited minds of our mining community should simmer down. From the time reports—excitable, inflammatory—that the country has received, there is really created a fastidious excitement that should from logical points be discontinued.

THE NEW MINES.—We gather the following items about the Color d'Alene from various sources. **EDITORS PRESS.** The Northern Pacific has made arrangements to take out 1,800 miners from the Gunnison country, Col., to the Color d'Alene mines. These are in addition to the 2,000 Black Hill miners, for whom arrangements were made several days ago. A great many nuggets worth from \$10 to \$50 each have been found in the Color d'Alene mines. A large number of miners are congregating in Salt Lake from Silver Reef and other districts, intending to outfit here for the Color d'Alene country. They will take their own teams and provisions enough to last them six months. Pritchard creek (Color d'Alene Mountains) carries a large, swift-flowing body of water, sufficient for all mining purposes, if claims should be located its entire length. The gulch is heavily timbered, many of the trees being from 12 to 14 ft in circumference. It costs about \$4 a day to live in Eagle City. There are five ft of snow on an average at Eagle City. The Ives, Campbell, Davis and Widow claims are being worked and paying from \$16 to \$25 per day. A party of 15 miners from Montana on their way to Eagle City, got wrecked on the Color d'Alene, and lost everything they had. There is quite a scarcity of flour and bacon at Eagle City. Flour raised in five days to \$16 a barrel and bacon 65 cents. Beef is 50 cents and venison 25 cents. In regard to the new mines, the Truckee Republican, of Wednesday, gives some recent information. T. Rogers, an old resident of that section, has just returned from the new gold fields. He is very enthusiastic in regard to them, and thinks that a new Leadville or Virginia City will soon grow up in its midst, as it is believed that the mining discoveries will extend over a region 100 miles in extent. Ed. Dyer, a former Truckeeite, writes from Spokane City, and says parties are fitting out there daily, and the sales of goods to mines foot up into the thousands every 24 hours. It is thought that a city of 40,000 inhabitants will grow up in the mines during the present year.

MONTANA.

BUTTE.—*Cor. Salt Lake Tribune*: The mines of this district commence the new year under very favorable auspices. The Anaconda, Parrot, Lexington, Alice, Moulton, Colusa, Clark's Colusa, Clark's Original, and the Silver Bow Co.'s mines all start the year 1884 with full forces of men. The Anaconda, however, can hardly be said to be working a full force. This property when the reduction works shall go into operation, will give employment to a much greater number of men than at present employed. Whatever stopping is being done now is confined mainly to the higher grade ore, which is shipped to Liverpool. None of the medium and lower grades

are being extracted, except what is unavoidable in mining the best quality. The low grade is being piled at the mine, and has now reached the enormous quantity of fully 200,000 tons. This huge pile—a mine on the surface—will be sent to the company's reduction works for treatment when connected with the mine by railroad, which will be in early spring. This company is shipping 2,000 tons per month over the Northern Pacific at rates below those formerly paid. Competing railroads and reduced freight charges are doing and will continue to do a great good to the mining interest of this Territory. The metallic wealth of Montana is enormous, and cannot be estimated. The output will continue to increase for an indefinite period. What the territory lacks most is some of the old-fashioned California enterprise, or the Colorado enterprise of to-day. There is no State or territory in the Union that contains as many metallic veins as this does, nor more that has been so lightly touched and run over. But things are gradually changing, and Montana will in the near future lead the list in metallic wealth. Butte, if nothing develops itself to put a check upon her, will this year far outstrip the record of the year just closed. The Liquidator and Gagnon companies are both sinking one hundred ft each. During the prosecution of this new development stopping is temporarily suspended, and will not be resumed until the new levels are opened. Both of these properties rank with the best. The Lexington company is also sinking the main shaft. It is the intention of the managers to sink 300 ft additional to the present depth—300 ft—which will make an aggregate depth of 800 ft, before cross-cutting the new, then to run two cross-cuts 150 ft apart. The vein disclosed in the last cross-cut—500 ft level—is large and rich, associated with the usual refractory metals, which have hitherto been successfully reduced by the gentlemen in charge, and the magnificent mill and other appliances erected for the purpose. The ore reserves in this mine at the present rate of extraction, are calculated to furnish the 60-stamp mill for a period of two years. The additional 300 ft now being sunk will double this period.

NEW MEXICO.

KINGSTON.—*Cor. La Vegas Gazette*, Feb. 2: This camp has to-day a better prospect of success than any other camp in New Mexico. Twenty thousand dollars has been taken from the "Solitaire" mine at an expenditure of \$500. The "Bullion" mine was bought for \$10,000. Up to date over \$75,000 has been taken out of it, the work, etc., costing \$36,000, and this year as much more can be expected with good reason. The "Superior" cost \$20,000, and they have taken out \$70,000, but they could have taken out much more, for they have passed bodies of ore that they have not touched, their work being only that of prospecting, and they have actually taken out and shipped "obstructions" so to speak. In sinking their shaft and running their drifts to explore the mine, they have met and taken out the ore upon which they realized the above mentioned \$70,000. The "Iron King" company are so well satisfied with their property that they are now putting up a \$60,000 smelter to reduce their ore. I could go on and name a dozen mines with hundreds of tons of ore on the dumps, but the above is enough to give you an idea of why we expect so much from Kingston. The formation is the best there is to make a rich and deep mining district. There are a series of contacts between lime (primary) and porphyry, with here and there large quartzite "blow-outs," and I am told on the very best authority, a well known mining man, that they are mines in Old Mexico exactly similar to the "Superior" and "Bullion" that have been worked to the depth of 2,000 ft, the ore becoming richer as depth was reached. The Superior has already a 300 level.

OREGON.

RAIN.—*Jacksonville Times*, Feb. 2: Much more rain has fallen in Josephine county than here and most of the miners are busily at work. The rain that fell during the week was not generally heavy, hence did not afford the miners everywhere an abundance of water. N. Cook informs us that the miners of Willow Springs precinct have not been able to do much as yet, which is generally the case throughout Jackson county. John Hall of Pickett creek is managing Bybee & Co.'s diggings near Waldo and left for that destination Wednesday morning. He says they are in better shape than ever and that the prospects for a good cleanup are favorable.

UTAH.

THE FRISCO M. & S. CO.'S SMELTERS.—*Southern Utah Miner*, Jan. 30: It having been reported that the Frisco M. & S. Co. intended building a new and extensive smelter at Franklin, south of the city, inquiry was made at the company's office to ascertain further particulars. The matter is under consideration, but no definite arrangements have yet been made. The mines of the company in Beaver county are yielding large quantities of ore; enough, in fact, to keep a number of stacks constantly running, and as smelting can be conducted near Salt Lake to greater advantage than in Southern Utah, the smelter will doubtless be built this spring. Fuel is cheaper here, and all necessary fluxes are at hand. The works will be on a very extensive scale, and will be quite an acquisition to the country.

THE F. M. & S. CO.—*Southern Utah Times*, Feb. 2: Friday night the miners and employees at the Carbonate Concentrator and Rattler mine were all discharged and the Frisco Mining and Smelting Company's operations in Frisco closed for an indefinite period. In reply to an inquiry regarding the closure, one party who knows, said "That it was on the account of the lack of sand on the part of the management," he admitted that the mine had never much more than paid expenses, but thought that in view of the recent opening out of new ore bodies in the Rattler mine, the company showed poor judgment in closing down. One by one are the props being pulled from Frisco's underpinning. "It is rumored that the Cave mine, property of the Frisco M. & S. Co. has also been indefinitely shut down, and the company's action is believed by many to be the result of disunion. It is hoped that matters will soon be readjusted and work resumed.

For Mining Shareholder's Directory, Stock Reports etc., see page 113.

Bodie's Bullion Record in 1883.

When the MINING AND SCIENTIFIC PRESS published its annual review of mining on this coast for the year past the record for Bodie district had not been made up. The Bodie Free Press, which has always kept an accurate record of the product of the mines of that district, has an excellent and carefully prepared article on the subject, which we here reproduce:

During 1883 there were less mines being worked and less producing bullion than in any year since 1877. The Noonday mill of 40 stamps, the Spaulding mill of 10 stamps, and the Miners' mill of 4 stamps, were closed down throughout the year. The Bodie Tunnel mill of 15 stamps was closed down the last 6 months of the year, and the Syndicate mill of 20 stamps the first 3 months. The Standard has kept 50 stamps employed constantly and the Bodie Con. 10 stamps. John Wagner's tailings mill was employed about 6 months. Considering this idleness upon the part of so many of our mines and mills, it will be a surprise to the majority of our readers to know that the bullion shipments in 1883 reached the large sum of \$1,582,667.08.

There has been such a marked improvement in the mining outlook of the district, commencing with the 1st of January, owing to the valuable strikes in the Standard and Bodie, that we confidently predict a doubling of the amount during the present year. Not only will the mines mentioned, and more especially the Bodie, largely increase their own production, but we expect to see every stamp in the district employed before the year is out. Already the Bodie Tunnel mill has resumed work (which, however, it would have done in any event), with prospects which are certainly most encouraging. The Syndicate has now a better grade of ore than ever before, and it will run steadily throughout the year. The Goodshaw, Champion and Dudley will soon be in operation, and negotiations are in progress looking to the resumption of operations on the Belvidere and South Bulwer. It would be strange if, with the fine bodies of ore which are known to exist in the Noonday, North Noonday and Red Cloud mines, and the fact that they are now in such a condition that they can be started up out of debt and with a clean balance sheet, they should not be consolidated and worked under heter auspices than before, and upon a self-sustaining basis.

The Standard.

The Standard Con. has crushed, during 1883, about 70,000 tons of ore, from which the sum of \$1,153,181 83 has been produced, an average of about \$16 50 per ton. The grade of ore has been lower than in previous years, and a greater quantity has been put through the batteries. In the earlier history of the district, when the average grade of Standard rock was about \$60 per ton, it would have been thought impossible to declare dividends upon ore of the grade which is now considered good. Necessarily a much greater quantity must be handled, and there is a consequent increase in expenses. Fortunately for the stockholders there are vast quantities of ore in the mine of this grade, and the able and experienced local management of the company understand precisely how to work it for dividends. During 1883 the Standard Company disbursed twelve regular monthly dividends and one extra dividend of \$25,000 each among its shareholders, aggregating \$325,000. The total amount of dividends declared by the Standard Company up to Dec. 31, 1883, aggregates \$4,350,000, a larger amount than has ever been declared by any mining company on the Pacific coast, not on the Comstock, excepting one—the Eureka Consolidated, which has disbursed dividends to the extent of \$4,817,500. Possibly we should also exclude the Richmond Consolidated, of the same district, an English corporation, of which we have no record. The dividend record of the Raymond & Ely was \$3,075,000, while that of the Northern Belle has aggregated but \$1,260,000. The best feature of the Standard is the fact that it gives assurance of a long continued season of productive-ness.

The following tables give the production of the Standard Con. mine by months during 1883, and the total production of the mine to Dec. 31, 1883:

OUTPUT OF STANDARD CON. MINE IN 1883.			
	Gold.	Silver.	Total.
January.....	\$85,409 03	\$13,954 52	\$99,405 55
February.....	107,347 28	14,466 10	121,813 38
March.....	75,590 10	9,311 52	85,219 62
April.....	97,939 10	14,996 16	112,735 26
May.....	95,984 38	12,651 36	111,656 34
June.....	98,416 02	13,956 95	112,372 98
July.....	81,244 75	13,963 49	95,208 24
August.....	78,588 33	13,400 45	91,988 78
September.....	87,693 52	8,184 74	95,878 26
October.....	79,619 43	8,777 80	88,397 23
November.....	62,388 11	8,678 50	71,066 61
December.....	61,757 38	7,713 14	69,500 52
Total.....	\$1,015,357 04	\$139,824 79	\$1,155,181 83

THE BODIE.
Throughout the year of 1883 the Bodie Company's mill has been running steadily upon an inferior grade of ore to that which it has heretofore worked. The mill is of but ten-stamps capacity, and it is situated at such a distance from the mine that it requires a high grade of

ore to pay expenses. In 1882 about 5,500 tons were crushed, netting in the neighborhood of \$90 per ton. During 1883 a larger quantity has been worked, aggregating probably 6,500 tons, and averaging about \$38 per ton. While this shows a considerable falling off in quality, it was still of a grade not to be despised, the Standard Company having paid dividends upon rock of less than half the value, but in large quantities. No dividends were paid by the Bodie Company in 1883. In previous years dividends have been paid to the extent of \$1,295,000. With the recent discoveries the Bodie is destined to enter upon a new career of prosperity. The following tables give the production for the past year, and the total production of the Bodie mine to date:

BULLION SHIPMENTS OF THE BODIE CON. MINING COMPANY FOR THE YEAR ENDING DECEMBER 31, 1883.			
	Gold.	Silver.	Total.
January.....	\$10,980 43	\$15,088 42	\$26,077 85
February.....	9,577 62	16,712 53	26,290 15
March.....	7,754 69	13,705 69	21,460 38
April.....	9,092 86	15,395 04	25,087 90
May.....	13,277 51	18,902 44	32,179 95
June.....	7,996 53	10,188 60	18,185 02
July.....	5,330 49	7,117 68	12,448 17
August.....	4,755 48	7,535 95	12,290 73
September.....	6,670 26	8,983 83	15,654 09
October.....	8,649 46	7,931 33	16,581 29
November.....	10,121 90	9,284 05	19,405 95
December.....	10,359 68	10,792 93	21,152 61
Total.....	\$105,176 32	\$141,643 78	\$246,820 10

Legal rate, \$1.2229 per ounce.
TOTAL OUTPUT OF BODIE CON. MINE TO DECEMBER 31, 1883.

	Gold.	Silver.	Total.
1878.....	\$1,042,236 80	\$188,200 00	\$1,230,436 80
1879.....	764,067 12	128,333 00	892,400 12
1880.....	429,817 80	75,000 00	504,817 80
1881.....	363,105 14	63,000 00	426,105 14
Total.....	\$3,599,226 86	\$644,533 00	\$4,243,760 86

The Syndicate.

The Syndicate mill of twenty stamps, has been running since about the 1st of April. The ore is low grade, but it has been worked at a minimum of expense. There has been a great improvement in the quality of ore of late, and with a further slight improvement the company would be able to pay dividends. The following tables give the bullion shipments by months and the total shipment of the mine to date:

BULLION OUTPUT OF SYNDICATE MINE IN 1883.			
	Gold.	Silver.	Total.
April.....	\$10,140 77	\$715 49	\$10,856 26
May.....	8,415 15	636 35	9,051 50
June.....	8,633 96	615 72	9,249 68
July.....	7,392 29	564 26	7,956 55
August.....	8,863 55	759 38	9,622 93
September.....	8,443 68	729 83	9,173 51
October.....	9,477 30	725 84	10,203 14
November.....	10,682 55	678 52	11,361 07
December.....	14,107 57	968 73	15,076 30
Total.....	\$85,637 82	\$6,752 14	\$92,390 96

OUTPUT OF THE SYNDICATE MINE TO DECEMBER 31, 1883.			
	Gold.	Silver.	Total.
1878.....	\$12,316 18	\$183,000 00	\$195,316 18
1880.....	24,769 75	3,000 00	27,769 75
1881.....	134,760 30	20,000 00	154,760 30
1882.....	75,458 20	10,000 00	85,458 20
Total.....	\$323,314 43	\$216,000 00	\$539,314 43

The Bodie Tunnel.

The Bodie Tunnel mill ran a portion of the time only in the early part of 1883. Since the mill closed down the work of exploration has been in progress, and a large amount of good ore has been uncovered. The mill is an excellent one, and has all the modern improvements. It is situated, like the Syndicate, directly under the mouth of the tunnel, and it is capable of reducing ore from their own mine or the Beehive Con. at very light expense. The following tables give the production during 1883, and in previous years:

OUTPUT OF BODIE TUNNEL MINE IN 1883.			
	Gold.	Silver.	Total.
January.....	\$9,643 00	\$0 00	\$9,643 00
February.....	10,434 00	\$0 00	\$10,434 00
March.....	12,241 00	\$0 00	\$12,241 00
April.....	8,408 00	\$0 00	\$8,408 00
Total.....	\$40,726 00	\$0 00	\$40,726 00

OUTPUT OF THE BODIE TUNNEL MINE TO DECEMBER 31, 1883.			
	Gold.	Silver.	Total.
1881.....	\$10,623 81	\$0 00	\$10,623 81
1882.....	129,216 53	\$0 00	\$129,216 53
Total.....	\$139,840 34	\$0 00	\$139,840 34

Total Production of Bodie District in 1883.			
	Gold.	Silver.	Total.
Standard Con.....	\$1,155,181 83	\$139,824 79	\$1,295,006 62
Bodie Con.....	246,820 10	\$0 00	\$246,820 10
Syndicate.....	92,390 96	\$6,752 14	\$99,143 10
Bodie Tunnel.....	40,726 00	\$0 00	\$40,726 00
Scattering, including Wagner's tailings mill.....	36,832 69	\$0 00	\$36,832 69
Total.....	\$1,582,667 08	\$146,576 93	\$1,729,244 01

Total Product of Bodie District.

The total product of Bodie District to December 31, 1883, has been as follows:

	Gold.	Silver.	Total.
1877.....	\$797,022 80	\$80,000 00	\$877,022 80
1878.....	2,129,732 58	\$183,000 00	\$2,312,732 58
1879.....	2,556,847 58	\$3,000 00	\$2,559,847 58
1880.....	3,063,690 13	\$20,000 00	\$3,083,690 13
1881.....	3,172,749 71	\$0 00	\$3,172,749 71
Total.....	\$15,520,499 12	\$216,000 00	\$15,736,499 12

THE PRODUCTION OF EACH MINE.
The total production of the various Bodie mines since the commencement of operation here in 1877 has been as follows:

	Gold.	Silver.	Total.
Standard Con., 1877-83.....	\$9,662,212 58	\$1,155,181 83	\$10,817,400 41
Bodie Con., 1878-83.....	246,820 10	\$0 00	\$246,820 10
Noonday and North Noonday, 1879-82.....	1,623,280 50	\$0 00	\$1,623,280 50
Bulwer Con., 1879-80.....	358,592 71	\$0 00	\$358,592 71
Syndicate, 1879-83.....	339,250 48	\$6,752 14	\$346,002 62
Bodie Tunnel, 1878-79.....	208,130 07	\$0 00	\$208,130 07
Bodie Tunnel, 1881-83.....	129,216 53	\$0 00	\$129,216 53
Belvidere, 1880.....	25,991 23	\$0 00	\$25,991 23
Oro, 1881.....	14,155 66	\$0 00	\$14,155 66
Red Cloud Con., 1877-78.....	10,927 50	\$0 00	\$10,927 50
Concordia, 1881.....	5,070 38	\$0 00	\$5,070 38
Sitting Bull, 1879.....	3,495 60	\$0 00	\$3,495 60
Mexican, 1877.....	2,000 00	\$0 00	\$2,000 00
Dudley, 1880.....	1,746 05	\$0 00	\$1,746 05
Summit (Kate Rogers), 1877.....	1,500 00	\$0 00	\$1,500 00
Boston Con., 1882.....	1,331 00	\$0 00	\$1,331 00
Miscellaneous, including placer gold, shipments by banks, tailings mill, etc., 77-83.....	336,741 06	\$0 00	\$336,741 06
Total.....	\$15,520,499 12	\$216,000 00	\$15,736,499 12

The Dividend Record.

Of the above production of over fifteen and one-half millions of dollars, the following

amounts have been disbursed as dividends by the companies named:

Standard Con.....	\$4,350,000
Bodie Con.....	1,295,000
Bulwer Con.....	165,000
Total.....	\$5,810,000

Of the foregoing amount \$35,000 was disbursed by the Bulwer Company in 1883.

We submit that this is a very creditable record, and gives the lie to the oft-repeated statement that mining does not pay, and that Bodie is "played out."

The Miners' Association Circular.

OFFICE MINERS' ASSOCIATION,
SAN FRANCISCO, Feb. 1, 1884.
SIR:—The Miners' Association deems it due to its members, as well as to all persons interested in mining in the State of California, to call their attention to the effect of the recent decree of Judge Sawyer in the suit of *Woodruff vs. The North Bloomfield Gravel M. Co., et al.*, a copy of which is enclosed. It is sweeping and harsh in all ways, and until modified or reversed by a higher Court, is the law of the State.

As will be seen by a perusal of the decree, the defendants are not only prohibited from mining, but from selling or disposing of water for any kind of mining, either quartz, drift, placer or hydraulic.

It must be evident to all that it is not the amount of debris which is discharged from a mine into any stream, but it is the right to discharge any debris of any kind which is enjoined. It is not a question of quantity or kind—as gold mining cannot be carried on without water or without debris or tailings or muddy water—it must be evident that mining cannot be carried forward on the Yuba or Feather Rivers, or their tributaries, and for same reasons cannot be carried on upon any other stream or water course in the State. For any person who may be a riparian owner upon any watercourse below any mine, which in any way deposits any debris in the stream or any of its branches, or muddies its waters, can enjoin the mine owner from so doing, it matters not what kind of a mine it is or where it is situated. If this is the law, as laid down by Judge Sawyer, it will apply to all, and it will not do for any one engaged in mining in California to hug himself with the delusion that the law will not apply to him or his mine.

This association has often called the attention of the quartz drift and other miners to the danger to their interests, under the belief, now a certainty, that in the attack upon the hydraulic miners all mines would be involved. The result, so far as Judge Sawyer is concerned, has proven that the surmises of the association were correct.

The counsel of the association are of the opinion that the decree of Judge Sawyer can be either modified or reversed in the U. S. Supreme Court on appeal.

To appeal the case will involve a large outlay, as the testimony alone covers over 12,000 pages, and the few who have borne the large expense of this and other suits in which the right to mine at all has been, as is now apparent, involved, desire from the members of the association their views as to whether or not an appeal shall be taken.

The Association also wish from others, than members, an expression as to whether or not they will aid in the expense of an appeal to the Supreme Court at Washington. To this end, the Association request you will examine carefully the decree (a copy of which is enclosed), and then that you fill up and return to it the enclosed blank, which speaks for itself.

If the response from the miners throughout the State will justify this Association, it will appeal the Woodruff case, and carry it through to the end, and so settle the question in suit. If not, it will let those who are specially interested in the case do as they please, and, as an Association, take no further part in the litigation.

It may be well, however, to say that a combined effort upon the part of the miners is now most important, for no one alone can stand the expense, and as the Association is the only channel or organization through which this effort can effectively be made, it should receive the unanimous support of all classes of miners, by liberal contribution, without regard to the kind or class of mine—for the time has now arrived when it is not a question of the kind or degree of mining—but of the right to mine at all.

Your early and prompt attention is earnestly called for. It may be well to state here that there is no individual or personal interest to be subserved by the Association. Its counsel is among the most prominent of the profession, with seven years' experience in this sort of litigation, and its officers are probably more familiar with the subject matter at issue than any other persons.

It is worse than folly for any mine owner, in the face of this decree, to say that his property and rights are not in great danger; and unless the miners as a class are satisfied to abandon their property without a struggle they should now stand shoulder to shoulder, and sustain the association to the end—as it says to you plainly that unless Sawyer's unjust decree can be modified or reversed on appeal, your mining property is valueless.

The Board of Counsel of the Miners' Association, as at present composed, consists of L. L. Robinson, Egbert Judson, Henry Pichoir, E. J. LeBreton, Thomas Bell and Robt. McMurray, representing mines on the San Juan Ridge; J. H. Bolles, of Excelsior mine of Smartsville;

Orrin Gowell, of Nevada City; Jas. L. Gould, of Dutch Flat, and A. Hayward, Thos. Price and J. B. Haggin, representing the mining interest at large.

Prompt action is not only desirable, but necessary. L. L. ROBINSON, President.
W. A. SKIDMORE, Secretary.

To the Miners' Association, 320 Sansome street, Room 23:—The undersigned hereby makes application to become (or continue) a member of the Association, and incloses \$10 as initiation fee (provided initiation fee has not already been paid).

The undersigned, for himself, or the Company represented by him, believes that the case of *Woodruff vs. N. Bloomfield et al.*, should be appealed to the Supreme Court of the United States for reversal or modification, and to this end agrees to pay monthly, for the term of — years, the sum of — to the Miners' Association, for that object.

Name.....
Residence.....
Name of Mine.....
Location of Mine.....
Dated.....

New Bridge on the Trinity River.

Mr. E. M. Benjamin furnishes to the Trinity Journal the following description of the wire suspension bridge across the Trinity river, at Junction City. The bridge is the property of Dr. Albert H. Hayes, of Boston, Mass., and has been constructed for the purpose of conveying the water of Canon creek to his gravel mines on the opposite side of the river. A brief description will suffice to show the magnitude of the enterprise, and it is all that I can give you at present.

The Towers.

The work was commenced on the 16th day of August, 1882, by cutting for the northeast tower foundation, running the tunnels for the anchorage, and excavating through the tailings in the river bed for the foundation of the southwest tower. Difficulties were encountered in sinking this tower, as the bed-rock was much lower than the water in the river. We were obliged to construct coffer-dams, and employ a steam engine to pump out the water while we sunk to the bed-rock and laid the stone masonry to high water mark. The foundation to the tower is 2x25 feet at the base, with a starling projection up the river of six feet, all laid in Portland cement. This pier is strengthened by the insertion of 300 iron anchors, some of which pass through from side to side. The top of the tower is forty-six feet above the highest water ever known in Trinity river, leaving the floor beams of the bridge twenty feet above high water mark. This will allow the river to fill up (as it will to some extent) with tailings from the mines above, and yet leave a large margin for safety, during the fifty years which it is estimated will be required to "work out" the Doctor's mines.

The tunnels for the anchorage on the northeast side of the river, are run forty feet into the bed-rock, on an incline of 14° 55'. Near the back of these tunnels are planted the four-inch anchor bolts thirty inches deep in the bed-rock, with back stays or guys anchored to two and a half inch bolts, set two feet into the bed-rock, and all set with sulphur.

The anchorage for the tower on the southwest side of the river is planted twenty-three feet deep in the tailings, and walled in with heavy masonry, laid in hydraulic cement.

The Cables.

Are 4½ inches in diameter, 516 feet long, and each composed of 1,050 No. 11 American gauge Bessemer steel wires, the breaking weight of which is about 2,800 pounds to the strand. The tension strain on each cable when the bridge is loaded with 3,000 miner's inches of water passing over it will be 320,000 pounds, and the weight on the towers 82,500 pounds to each cable. The cables are served with No. 11 Norway wire, ¾ inch pitch. Six hundred pounds of white lead and 130 gallons of linseed oil were consumed in the construction of the two cables (not laid on with a brush, but poured in from a cup as the cable was served), so that all the vacancies between the wire are filled with paint.

Weight of the Cables.

There was used in the cables 43,524 pounds of wire, exclusive of the weight of the white lead and oil. The cone blocks, links and pins, anchor-plates and bolts, tower-bolts and saddles, suspension-rods, clips and washers weighed 39,102 pounds.

The bridge is now complete, with the exception of enclosing the towers, and Mr. Guthrie is engaged in getting out the timber for that purpose. There is 32,000 feet of lumber in the framework of the towers.

The Hydraulic Pipe.

Which is to convey the water across the Butler divide in the mountain is 34 inches in diameter, and 2,212 feet long, the greatest depression being 310 feet.

The pipe through which the water will be conveyed across to the McKenna mine is 18 inches in diameter, and will be used under any desired pressure of from 200 to 500 feet. About one-half of the pipe is already made.

The pipe for conveying the water to the celebrated Keno mine will be 5,067 feet long and 27 inches in diameter. We expect to have the iron rolled for this pipe in time to arrive here about the 1st of July, 1884. The span between the towers of the bridge is 350 feet.

THE ENGINEER.

Cantilever System of Bridge Building.

The completion of the new cantilever bridge over the Niagara Falls for the Michigan Central railroad has brought the new system into prominence, and is likely to awaken considerable interest wherever bridging high points is desirable.

The engineer of the Central Bridge Company of Buffalo was asked to explain the peculiar character of what is now referred to as a cantilever bridge. The new Niagara bridge is the first bridge of that style and affords an excellent illustration of the principle. The term cantilever is borrowed from a bracket or double bracket supported in the center as used in architecture, and here the architectural engineer and the mechanical engineer unite labors. The principle is here first applied to a bridge proper; but in constructing the road bed for the West Shore, Hudson River railroad, essentially the same principle was applied where the bracket rested upon an abutment with one end inserted into masonry under the rock of the mountain, and the arm projected out over the water, upon which the track is laid.

In the cantilever bridge there are two arms of the bracket, one extending over the river, the other toward the shore and secured to masonry. Upon the two arms reaching toward each other from each shore, a central span is laid, or the bridge proper is so laid connecting with each but having the usual preparations for responding to the changes in temperature.

The shore arm of the cantilever or bracket rests, as I have said, upon a second pier, built back of the first one at the river's brink. If there was no such support, any weight—like that of a railroad train—if placed upon the shore arm, would depress it toward the ground and correspondingly elevate the outer or stream end. It would be as if, after perfectly balancing a plank on a log, you should place a weight at one end of the plank. But this is not enough. Suppose the railroad train has passed under the tower over the main pier out upon the cantilever or balanced beam; the extra weight would depress the outer end and at the same time elevate the inner or shore end. So the shore end not only rests upon a support of masonry, but it is fastened to it, to prevent the train from tipping the beam up into the air and falling into the stream.

For bridges having long spans the system is asserted to be the most economical. Less material need be used to secure the same strength, rigidity and stiffness than in a suspension bridge, for instance. Less false work or scaffolding is needed for the erection of a cantilever bridge than for any other braced structure, thereby making it capable of construction with more ease and less danger of disaster and with no obstruction to navigation. The central span resting upon the outer or stream ends of the two brackets can freely expand with the heat of summer and contract with the cold weather. One end of this central span is fastened to one of the brackets, the other end being placed upon rollers. The deflection from the horizontal under the full load capacity of the bridge is not half so great as it would be in a suspension bridge of the same length of span.

The principle is by no means new, only as in its application in the erection of so extensive structures. Supporting structures by two long arms upon uprights is an old idea, but capable of numberless modifications in a live engineer's management, as may be seen in the single post supports of the New York elevated railways. The new Niagara river bridge, however, is the first bridge of any magnitude actually built upon this system. The first one in Europe will be the great bridge across the Firth of Forth, Scotland, now building. The cantilever system, as will readily be suggested to any engineer, is capable of a great variety of additions and modifications. The arms may be thrown out from one central pier instead of from two near shore, and a roadway may be elevated above the railway track, or one may be suspended below the track, or both if such were desirable, or the truss or bracket may be reversed and built entirely above the pier so as to be a low bridge and still offer no obstruction to the high water.

A FEAT IN MINING ENGINEERING.—The Pottsville Journal says: At East Franklin colliery, on Thursday, was consummated one of the greatest feats in mining engineering that has been accomplished in the coal regions, and it is a signal instance of the power of mathematical calculations, as applied to the construction of works of this kind. The Reading Coal and Iron Company contracted with a party from the oil regions about nine months ago to put an eight-inch hole down at this colliery, but on account of the inefficiency of the workmen it did not succeed. A few months ago the company contracted with Mr. McEehoue, of Scranton, to continue the work. As the hole is to be the passage way for a cable, and is 760 feet in depth, some fears were entertained by Mr. George Patterson, resident engineer, that the mines would not be pierced just where it was intended they should be; but when the drills struck bottom they were not a half inch out of the way of their calculations.

USEFUL INFORMATION

What the Colors of Buoys Mean.

"On entering any harbor in the world," said a pilot to a *Sun* reporter, "where the channel is marked by buoys, you will find that those on your right as you pass in are painted red, and those on your left black. If you should see one painted in red and black horizontal bands, the ship should run as close to it as possible, because that indicates the center of a narrow channel. Buoys with red and black vertical stripes always mark the ends of spits and the outer and inner ends of extensive reefs, where there is a channel on each side. When red and black checkers are painted on a buoy it marks either a rock in the open sea or an obstruction in the harbor of small extent with a channel all around. If there are two such obstructions and a channel between them, the buoy on the right of you will have red and white checkers, and the one on your left will have black and white checkers. When a wreck obstructs the channel a green buoy will be placed on the sea side of the wreck, with the word 'wreck' plainly painted on it in white letters, provided there is a clear channel around it; otherwise, an even number will be painted in white above the word 'wreck' when the buoy is on the right side of the channel, and an odd number if the buoy is on the left."

COLORING SOFT SOLDER YELLOW.—When brass is soldered with soft solder, the difference in color is so marked as to direct attention to the spot mended. The following method of coloring soft solder is given by the *Metalworker*: First, prepare a saturated solution of sulphate of copper (bluestone) in water, and apply some of this on the end of a stick to the solder. On touching it with a steel or iron wire it becomes coppered, and by repeating the experiment the deposit of copper may be made thicker and darker. To give the solder a yellow color, mix one part of a saturated solution of sulphate of zinc with two of sulphate of copper, apply this to the coppered spot and rub it with a zinc rod. The color can be still further improved by applying gilt powder and polishing. On gold jewelry or colored gold, the solder is first coppered as above, then a thin coat of gum or isinglass solution is applied and bronze powder dusted over it, which can be polished after the gum is dry and made very smooth and brilliant; or the article may be electroplated with gold, and then it will all have the same color. On silverware the coppered spots of solder are rubbed with silvering powder, or polished with the brush and then carefully scratched with the scratch brush, then finally polished.

PAINTING ON ZINC.—According to the *Painters Magazine*, painting on zinc is made easier by employing a mordant composed of one quart of chloride of copper, one of nitrate of copper, and one of sal ammonia, dissolved in 64 parts of water, and to this mixture is added one part of commercial hydrochloric acid. This is brushed over the plate of zinc, and after 12 or 24 hours it dries a dullish gray color. Painting upon this surface the colors will adhere in a perfect manner. Another method, according to the same authority, is as follows: Procure some muriatic acid of full strength, and drop into it some pieces of zinc until effervescence ceases. Add an equal quantity of water, and with a sponge tied to a stick wash over every part of the surface to be painted. This roughens the surface and takes off that sort of greasiness which prevents paint from adhering. After the acid has remained a short time wash it over with water or diluted vinegar, dry off and paint.

THE "silkworm gut" used for fastening fish-hooks to fishing lines is taken from the silkworm just as he is ready to open. The worm is very carefully pulled apart and the glutinous matter from which the worm spins its silk, and which is contained in the *serotaria*, or silk glands, is then drawn out in a single thread of variable length, from one and a half to three feet, and is slowly allowed to dry. Spun says, regarding the production of this material, that "hitherto silkworms only have been employed for this purpose, but a plan has been set on foot to utilize caterpillars which infest food plants. It is to be hoped that it will prove a practical success, as, if the gut can be produced in long pieces, and at a moderate price, it will find numerous applications."

VIOLIN VARNISH.—The *Scientific American* gives the following formula for preparing a beautiful varnish for violins: Rectified alcohol, half gallon; add six ounces gum sandarac, three ounces gum mastic, and half pint turpentine varnish; put the above in a tin can by the stove, frequently shaking until well dissolved. Strain and keep for use. If you find it harder than you wish, thin with more turpentine varnish.

DRAFTING WATER THIRTY-SEVEN FEET.—Mr. David P. Stewart, of Buffalo, it is said has shown to the *American Machinist* a method of lifting water thirty-seven feet by a common suction pump. About twenty-five feet from the bottom of the suction pipe there is a tee with an ell, from which latter there is a vertical capped pipe extending up to the height of the suction valve. The lower end of the suction

pipe has a check valve. Both pipes are filled with water, and the vertical side pipe, or stand pipe, capped. The pump will suck the water out of the stand pipe and form in it a vacuum that will sustain the water in the suction pipe, and enable water to be drafted thirty seven feet. If so, the same principle ought to apply to even greater lifts.

COOKING BY ELECTRICITY.—Some parties in Canada are reported to have invented a machine for cooking by electricity. It consists of a saucepan or hot plate, so isolated by non conductors that the bottom forms the positive pole of a current. The other pole is attached to a movable point which travels over the under surface of the pan in circles sufficiently quick not to burn a hole through. Some cakes were cooked in the apparatus and eaten by the inventor and his family, who are believed to be the first members of the human race who have eaten food cooked by the electric spark. One lady declared she tasted the flavor of electricity "quite strong."

THE BANANA TREE AS A FOOD PRODUCER.—The Spaniards have a superstitious reverence for the banana, believing it to be the fruit of which Eve partook in Paradise. It is asserted that 44,000 pounds of bananas can be produced on the soil that would be required for 1,000 pounds of potatoes, and that the area that would be required to raise wheat enough for one man would produce bananas enough to feed 70 men.

ARTIFICIAL CORK.—A patent has been granted to Grunzweig and Hartman, in Ludwigshafen-on-the-Rhine, covering a process of making artificial cork by thoroughly incorporating sixty-three parts of ground or powdered cork chips with 180 parts of boiling starch paste. The resulting plastic mass is pressed into forms and then dried in hot rooms.

TO DETECT FALSE BUTTER.—An Austrian chemist gives this recipe for detecting false butter: Melt a little of the suspected article; soak a wick in it. When again solid, light it like a candle; blow it out. If it smells of blown-out candle, it is oleomargarine; if of fresh butter, why, butter it is.

FREIGHT CURIOSITIES.—A Boston paper says that one of the curiosities of railroad freights is that earloads of good potatoes can be laid down in that city from sections of the West at ten cents per bushel lower than potatoes can be brought from Maine, one of its nearest neighbors.

GOOD HEALTH.

Dandruff and Loss of Hair.

Dandruff is a condition in which branny scales are shed from the scalp in great abundance. It may be due to eczema or pityriasis, or may result from a disorder of the sebaceous glands, and from aene. The latter is the most common cause of the disease. In this form of affection, the abnormal secretion of the fat glands appears upon the scalp as yellowish scales. This condition is sometimes present upon the nose and cheeks as well as the scalp. It is often a very annoying complaint. When affecting the scalp, it sooner or later results in loss of the hair. This is not because the dandruff destroys the hair, but because the same disease which causes the dandruff interferes with the nutrition of the hair, thus occasioning its loss. On account of its tendency to produce baldness, the disease should never be neglected. Dandruff is most generally occasioned by disorder of the digestion, or some other debilitating disease.

Treatment.—Restore the general health by proper attention to the digestion and hygiene. For dandruff of the face, apply the same remedies recommended for the skin. The scalp should be treated in the same way, by gentle shampooing with ordinary washing soap, once or twice a week. A very soft brush should be used. Neither a stiff brush nor a fine comb should ever be used for removing dandruff. For shampooing, a liniment composed of equal parts of castor-oil and alcohol may be rubbed on the scalp, or an ointment composed of a dram of tannin to an ounce of vaseline.—*Good Health*.

Health in the Shop.

It is profitable for proprietors to make their shops and factories healthy and pleasant for their workmen. This topic is ably discussed by the *Industrial World*:

Some of the best things to be seen at the modern shops are the conveniences for the personal cleanliness and comfort of the men employed, and from the few thus equipped the most useful lessons may be learned by those still content to run in the rut of unfortunate indifference which has so long prevailed.

The placing of such things as water-closets in the centre or at one side of a large shop apartment is a step in the right direction, not only in making sure that the enclosure will be kept in the best possible condition; but also that there shall be the least possible time lost in it. Both of these considerations have a real money value, and the better chance of thus maintaining the sharpest watch over them both while attending to other current duties, relieves foremen or

managers from some needless sources of annoyance.

It was long ago proposed to use for washing fixtures in machine-shops, and other places where they must be provided, along pipe of suitable size with a small thumb pet-cock on the under side of it for each man, but this very convenient arrangement has been by far too rarely used. A sink or trough of moderate size is needed to catch and lead away the water falling from the hands, and the whole is found to be of the most reasonable cost in furnishing and in the amount of water consumed. Of the ease with which such a water supply could be heated in the supply-pipe itself, and of the importance that each man should have clean water for his own use, mention need hardly be made.

It has but seldom been found by those who keep close watch of the effect of such improvements that they do not pay handsomely for themselves. Their influence is by no means so indirect or so uncertain as has sometimes been supposed.

WOOD IN SURGERY.—Wood is employed scientifically in surgery in a different form from ordinary splints. A foreigner has introduced wood-wood as a cheap and useful dressing for wounds, and it is being prepared extensively as a commercial staple for surgical dressings. It is finely ground wood, such as is extensively used in the manufacture of paper. It is a clean looking, delicate-fibered, soft, yellowish-white substance, having an odor of fresh wood, and absorbs an immense quantity of liquid. The best wood-wood was found to be that which was obtained from the *Pinus picea*. The wood-wood thus procured was first pressed, passed through a sieve, then dried and impregnated with a solution containing $\frac{1}{2}$ per cent of sublimate and 10 per cent of glycerine. The advantages claimed for this dressing are numerous. It is cleanly, fresh, and of a whitish color; it is at the same time soft and delicate in texture as cotton, and "extraordinarily cheap." The actual price is, however, not stated. It possesses some antiseptic properties naturally, has an agreeable odor, and is exceedingly elastic even in thin layers, so that bandages can be put on more lightly with this than with any other dressing. Its absorbent properties are so high that it takes up 12 times its own weight of water, so that 10 ounces of well dried wood-wood after complete saturation attain a weight of 120 ounces.

GERMAN TREATMENT OF DIPHTHERIA.—The new German remedy for diphtheria—turpentine—appears to find many advocates. Children take one teaspoonful morning and evening, adults a tablespoonful; in children, tepid milk is given after it, and it might also be mixed with the same. Half an hour after the administration of the drug, a bright redness begins to spread from the margin of the diphtheritic exudation, and this redness becomes generally diffused over and takes the place of the false membrane, and the disease is said to disappear within twenty-four hours without leaving the slightest trace. While this remarkable effect is said to be invariably met with when the remedy is made use of at the very commencement of the disease, those who recommend it so highly assert that it is also successful, only less rapidly, in cases that have progressed for several days.

HOT WATER FOR TORPID LIVERS.—Two Polish physicians have been making experiments for the purpose of ascertaining the effects upon the liver of alkaline mineral waters. Their results indicate that alkaline waters increase the quantity of bile when taken freely. These experiments also included observations upon the effects of hot water upon the liver, the conclusion being that hot water possesses the same properties as alkaline waters. We have proved in a large number of cases that the use of hot water is one of the most effective means of encouraging a torpid liver. When the liver is torpid, there is usually a red sediment in the urine. From six to eight glasses of hot water should be taken daily until the sediment disappears.

A SUBSTITUTE FOR TRANSFUSION OF BLOOD.—William T. Bull, M. D., Surgeon of the Chambers Street and New York Hospitals, says the use of saline injections in Asiatic cholera in the early part of this century demonstrated the safety of such a procedure, and likewise its inefficiency in checking the career of that disease. Within a few years, however, this method has risen to the level of a life-saving measure, as a substitute for the transfusion of blood in conditions of acute anemia and collapse. Of nineteen patients who have been subjected to the operation, when at the point of death, thirteen have entirely recovered; in three death was averted, but occurred later; and in the remainder only a temporary improvement was effected.

FETID AND PROFUSE PERSPIRATION.—This condition is most commonly found in the feet, although the armpits and other parts of the body are sometimes affected. The following treatment will be found successful in most cases: Just before retiring at night, take a hot and cold foot-bath, dipping the feet first in cold water then in hot, allowing them to remain in each for about one half minute, and repeating the operation fifteen or twenty times. Then wipe with a soft towel, and, when nearly dry, rub with subnitrate of bismuth, using a large teaspoonful of the powder for each foot.

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SAN FRANCISCO:

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Passing Events.

Snow in San Francisco is something new for
us to record, yet it fell here on Wednesday
night and Thursday morning. The bright sun-
shine that followed soon dispelled it, but the
hills around the bay were clothed in white for
several hours, much to the passing delight of
the San Franciscans, to whom the sight is un-
usual.

As the days lengthen there seems to be more
and more interest displayed in all that concerns
the Cœur d'Alene mines. Miners all over the
country seem to be getting ready to go there,
and many are on the way already. Still all
accounts agree that it is altogether too early to
attempt to do anything in that cold region for
two or three months to come. It is specially
hazardous for men without means to attempt
the journey, on the hardships of which all
agree.

MECHANICS' INSTITUTE LECTURES.—The usual
winter course of lectures under the auspices of
the Mechanics' Institute commenced this week.
Prof. Joseph Le Conte gave the first lecture on
"Mountain Building," a subject which will be
continued on the 14th. Alexander Del Mar,
"Corporations," February 21st; Major W. A.
Jones, United States Army, "Home Illumina-
tion—Lamps," February 28th; Walter M. Le-
man, "The Drama of the Stage," March 6th;
A. Wendel Jackson, "Crystals," March 13th;
and Prof. W. B. Rising, "Explosives," March
20th and 27th. Tickets may be had at the
Library. Admission will be free.

Mining Investments.

The statement is very frequently made that
mining is not profitable, and that it costs a dol-
lar to get a dollar out. Even when that is the
case, the old dollar is not lost, but has simply
changed hands, while there is also a new dollar
for somebody else. It is a story of blades of
grass in dollars. There is a new dollar added
to the world's circulating medium and riches;
and one which is not perishable either, in the
ordinary sense of the word, though with most
of us the dollars disappear more rapidly than is
readily accounted for. Even when a man puts
\$25,000 into a mine and only \$5,000 comes out,
the world is \$5,000 better off, though the indi-
vidual may have \$20,000 less in the bank than
he had. But that \$20,000 has been scattered
among miners, teamsters, traders, storekeepers,
etc., and done a great deal more good than
when stored away in a bank.

But it is pretty certain that the eighty or
ninety millions of dollars in gold and silver
turned out every year by the mines of this
coast do not cost even half of that sum for
actual production. If that has been the case,
California, at any rate, has not had its share of
the invested millions, though it gave back \$15,
000,000 in hard coin. Other regions have had
scant investments, yet have given returns. It is
very difficult, indeed, to get at exact figures of
investment and returns. Yet all these new mil-
lions must enrich some, and increase the comfort
and happiness of many more. Thousands are
given employment directly by the mines, and
many other thousands are benefited incidentally.
Yet there are people, because a sort of gambling
has been more or less identified with the min-
ing interests, who deery mining in every way,
and try to discourage it. There is no industry
of a nature which will yield a direct sum of
ninety millions a year which should not be en-
couraged in every way.

Wages in Borax Mining.

The manufacturers of borax on the Pacific
coast labor under several disadvantages as com-
pared with producers elsewhere. Labor and
other factors of production are dear; the borate
fields are located in desert regions which afford
few facilities for carrying on the business of re-
fining, being at the same time several hundred
miles distant from San Francisco, the principal
entrepot and shipping point for the entire coun-
try. After shipment to San Francisco, the
borax has to make long journeys by sea or land
to reach the great marts of the world.

The following statement of expenditures,
made by one of our largest California borax
mining companies, on account of labor and sup-
plies for a month, fairly represents expenditures
of the other borax companies, both in California
and Nevada on account of these items.

Scale of Wages for White Labor in Borax Mining and Manufacture.

Classes of Employees	Wages
	Per day Per month
Clerk at mine	4.25 130.00
Agent at railroad station	100.00
Blacksmith, first	\$5.00
Blacksmith, helper	3.00
Engineer	4.00
Teamster	1.00
Swampers or helpers	1.00
Feed Teamster	3.25
Coppers	3.25
Boiler men	4.25
Washmen	1.25
Laborers	1.25
Cook	50.00

In addition to this the men are boarded free,
which costs the company about \$1 per day each.
These are wages for white men.

The wages of Chinese are different. The
same company pay Chinese firemen \$50 per
month, and the laborers \$1.25 per day; these
men boarding themselves.

The white labor list for a month, with 31
days, equals 25 men \$1,504.96; and 35 Chi-
nese comes to \$1,400, or a total for labor for a
month of \$2,904.96.

Forage consumed for the same month
amounted to \$620.61 for two large teams of
four animals, which is 50 cents per day per
animal of the ten transportation teams which
have 55 miles of wagon haul. There were also 35
animals for teams at the works, which cost
\$224.47 for forage during the month.

Average Wages Per Month in Borax Min- ing in Nevada

Classes of Employees	Rate
White laborers	45 and 50 cents per day, equal to \$75
Chinese	40 and 45 cents per day, equal to \$60
Superintendents	60 to \$75 and found
Teamsters	50 to \$60 and found
Blacksmiths	75 and found
Medicines	75 and found
Engineers	100 and found
Firemen	50 and found
Transmitters	75 and found

Volumetric Determination of Mercury.

There recently appeared in one of the German
metallurgical periodicals a description of a new
method for the volumetric determination of
mercury, which we translate and condense. If
recently precipitated mercurous chloride is
covered by sulphuretted hydrogen water, the
mercurous chloride is at once transformed into
sulphide and hydrochloric acid. If the excess
of hydrogen sulphide is removed in a suitable
manner and the quantity of chlorine in the so-
lution determined, the proportion of mercury
may be readily calculated. The author pro-
ceeds in the analysis as follows: If the mercury
is present in the mercurous state, it is precipi-
tated at once with the sodium chloride. If it
exists in the mercuric state, and no hydro-
chloric acid is present, a sufficiency of sodium
chloride is added, and then a solution of ferrous
sulphate and excess of potass.

The mixture is allowed to stand for a few
minutes in the cold and diligently stirred up
with a glass rod. The precipitate of mer-
curous oxide and ferrous-feric oxide is strongly
acidified with dilute sulphuric acid and stirred
till the black precipitate has become a pure
white, the formation of mercurous chloride
being complete. This is filtered and washed
well, placed along with the filter in a beaker,
covered with sulphuretted hydrogen water and
allowed to stand for a few minutes. The hydro-
chloric acid formed is neutralized by the addi-
tion of an excess of elutriated barium-carbonate,
whilst the excess of sulphuretted hydrogen is
removed by a solution of zinc acetate, which at
the last is added in drops until no more odor
of hydrogen sulphide is perceptible.

The precipitate is filtered again, and, after
washing, the filtrate is mixed with an excess of
potassium chromate and titrated with a silver
solution in such a manner that at first a small
excess of silver is run in, which is removed by
means of a measured quantity of an equivalent
solution of sodium-chloride, and the operation
finally completed with a centinormal silver
solution.

Proportion of Profit to Yield.

On page 106 of this number of the MINING
AND SCIENTIFIC PRESS are some very interesting
statistics concerning one of the most prominent
mining regions of California—Bodie, in Mono
county. The recent revival in that camp makes
them of more than passing interest. We more
particularly call attention to them, however, as
they afford a very strong argument in favor of
the statement that "mining does pay," and
just at this time are useful in proving the value
of an industry which many see nothing in.

These mines have been producing for some
seven years, and their record in production and
dividends is as follows:

Year	Bullion	Dividends
1877	\$1,250,000.00	\$200,000.00
1878	1,150,000.00	135,000.00
1879	2,300,000.00	80,000.00
1880	1,000,000.00	1,000,000.00
1881	1,100,000.00	35,000.00
1882	1,100,000.00	80,000.00
1883	1,100,000.00	35,000.00
Total	\$11,250,000.00	\$5,114,000.00

Out of a net product of fifteen and a half
millions, dividends to the amount of nearly six
millions have been paid. And this is not a sin-
gle exceptional mine, but the result of seven
years' work in a big mining camp. If all the
manufacturing establishments could make any-
thing like that proportion of profit, business
would be better than it is. Of course there
have been failures and individual losses, but
there have also been successes and individual
profits. The general result shows in favor of
the latter. The proportion of profit to yield is
what we want to call attention to in this in-
stance. What it cost to cause the product or
yield we do not know, nor is it of moment in
this connection. The result is probably double
what any legitimate manufacturing establish-
ment would expect in the ordinary course of
business. This money is out of the ground itself
—a product of nature—and is not the result of
barter or commercial exchange.

**PLATINIZED MAGNESIUM AS A REDUCING
AGENT.**—Pure water is not decomposed by
magnesium, but if a trace of platinum chloride
be added, the decomposition takes place freely.
A writer in *Berg und Hüttenmanische Zeitung*,
recommends this as a very useful reducing agent
for organic substances.

A DYER cannon ball crusher has been sent to
Micaal City Camp, Washington county, Idaho.

Foundry Notes.

At the Golden State and Miners' Iron Works
they are making an upright engine 14x14 for
the Judson Manufacturing Company's works
across the bay. They are also making a 12x18
engine for the California Iron and Steel Com-
pany at Clipper Gap, to be used as a hoisting
engine.

This foundry has a gang of men at work on
the Von Schmidt dredger in the Brooklyn Basin,
Oakland harbor, where it has been some six
months dredging out the approach to the pro-
posed canal into San Leandro bay. Heavier
shaiting and gears are being put in, and the ma-
chine is being generally overhauled.

The dredger has done so much more work
than was expected of it that its parts were
found in many places to be too light. It has
been doing some very heavy work, digging from
4,000 to 6,000 cubic yards a day, where the old
clam-shell could dig but 1,000. The owners
have a large contract, and will be able to do
even better work when the various parts are
strengthened.

The foundry are now working castings for
120 new logging cars being built by Carter
Bros. for the California Redwood Company, who
are going to use them in the timber region of
Humboldt county. This company has lately
bought out John Kentfield, and is going exten-
sively into lumber manufacture. The works
have just completed a hydraulic press for this
company, which is intended for pressing car
wheels or axles.

Mining Revival in Shasta.

As will have been seen by those who have
read our weekly summary of mining news, there
is quite a revival of mining in Shasta county.
For a long time that section of the State has
been somewhat neglected by the mining capital-
ists, and the miners have had to get on as best
they could. In fact, the miners have been
working out their own salvation without much
outside help. It is gratifying to note now,
therefore, that mining matters in Shasta are
looking up, and that many promising claims
are coming into public notice. These success-
ful mines will help others, as they will encour-
age many men to go on with their own claims
and develop them to good paying properties.
In conversation recently with Judge Aaron Bell,
he told us of the Iron mine (silver) owned by
Camden, McGee and Sallee, and which is seven
miles northeasterly from Shasta, and three
miles from the line of the California and Oregon
branch of the C. P. R. R. The ledge is said
to be something like 150 feet wide. They are
shipping ore to San Francisco and Colorado,
and it sells as high as \$140 per ton. Shasta
county is looking up in every direction. The
silver mines are promising, and the gold mines
also. There have been about half a dozen of
the Dyer cannon ball quartz mills (built by the
Globe Iron Works of the city), put up, and
they turn out well. Some 500 new settlers
have come into the county in the past six
months. In the coming season there will be
80 miles of finished railroad.

Bluestone.

The origin of the bluestone industry at Day-
ton, Nevada, which subsequently attained such
magnitude, was due to the endeavors of cer-
tain mill owners who found it necessary to re-
fine, in order to profitably dispose of the bul-
lion which they obtained in working Comstock
tailings. By the base process, as the one in
vogue was termed, it was found advisable to
employ large quantities of copper sulphate in
amalgamating, and even as much as 20 pounds
to a ton of tailings were used. In consequence,
the bullion produced contained from 80 to 90
per cent of base metal, principally copper.
Besides the loss in copper the mill owner was
obliged to bear a heavy discount on his
produce.

The estimated amount of bluestone (sulphate
of copper), manufactured in this country in
1882, was between 9,000 and 10,000 barrels of
an average weight of 350 pounds. The spot
value was about 54 cents per pound, making
the total value of the product between \$150,
000 and \$200,000. The principal centers of
manufacture are: Omaha, Neb.; Cleveland,
Ohio; Philadelphia, Penn.; Salem and Boston,
Mass.; New York City; Newark, N. J.; Provi-
dence, R. I.; Baltimore, Md.; Dayton, Nev.,
and San Francisco. The leading utilizations of
bluestone are in pan amalgamation, the manu-
facture of Paris green and dyes, and in tele-
graphy.

A New Pulley.

The Fulton steel pulley is a new article of manufacture, combining strength and lightness to an unusual degree. Reference to Fig. 1 of the engraving will give the reader an excellent idea of the appearance of the pulley. It will be seen to consist of three parts—the rim, the center and the hub. The rim and center are of steel, while the hub is malleable iron. One great feature of the Fulton pulley lies in the corrugations of the steel center, or disc. Every machinist will at once recognize the immense additional strength imparted to the pulley by these corrugations. They may be laid on concentrically, as in the cut, or radially, to meet the wishes of users. The corrugating of these discs is done by a powerful press made especially for the purpose. The sheet of hot steel is placed in the press, and the die brought down with great force, not only corrugating the disc, but punching out every alternate "ear," by which the rim is afterwards to be made fast. The withdrawal of the die pulls up the other alternate ears, thus by one operation leaving the center fully corrugated, and the ears bent alternately to one side and the other, ready for finishing. The rim, as before stated, is of steel. This rim is drawn around the center disc while cold by powerful machinery, and there riveted to the ears. The place of meeting of the two ends of the rim is a double joint, and as strong as any other point in the periphery of the pulley.

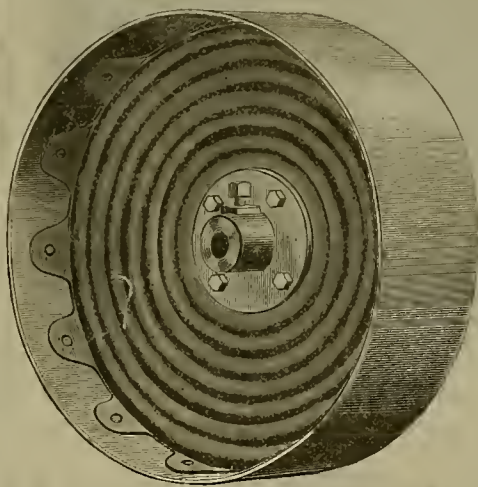
The hub is cast in two halves, one for each side of the wheel; the face of each half being cast with a corrugation to fit snugly to that of the steel disc. The two halves of the hub are placed in position and bolted firmly together through the disc. A sectional view of the pulley is shown at fig. 2, and fully illustrates the method of joining the various parts. This cut also shows the form of the corrugations on the steel disc, with the alternate ears on either side riveted to the rim. The rivet holes are punched and the riveting completed while the pulley is in the chuck, so that when it is released the pulley is made. Fig. 2 also shows the hub with its corrugations closely hugging the disc, held there by the bolts. A split pulley is also made under the Fulton patents, which is so cheaply done as to bring the price down nearly to that of the ordinary pulley. The Fulton pulley can be made up to five feet in diameter. In the larger sizes a double disc is used to give additional strength and stiffness. Let us now briefly note the advantages claimed for this invention by the manufacturers. First—It is lighter than any metal pulley now in use, having only about half the weight of the lightest of these. Second—It is fully as strong in doing its work, and is absolutely free from any danger or breakage. Third—It is perfectly balanced from the moment the rim is drawn into position. Fourth—The lightness of the pulley admits of a far lighter hanger, thus decreasing cost in this way. Fifth—The friction is greatly reduced, enabling a lighter shaft to do the same amount of work. Sixth—A great saving of labor is effected by using the Fulton pulley, when placing it in position, because of its extreme lightness. The Fulton pulley may also be made either crowning or flat, and to run vertically or horizontally as occasion may require.

So far as experience has gone the new pulley is very satisfactory. Experiments are now in progress to test the strength and efficiency to the utmost. These experiments are being conducted by eminent authorities in mechanical science. The Fulton pulley will be manufactured by three well known firms in the United States, the Indianapolis (Indiana) Machine and Bolt Works, The John T. Noye Mfg Co., Buffalo, N. Y., and The Falls River Co., of Cuyahoga Falls, Ohio. Messrs. Parke & Lacy have been appointed agents on this Coast, and it may be that the pulleys will be manufactured also.

SENATOR Hill's mineral land indemnity bill came up in the Senate, with Senator Miller's substitute adapting it to California, so as to allow that State the right to make selections for school lands in the eighteenth and thirty-sixth sections retained as mineral pending over it. By previous agreement with Senator Hill, Miller withdrew his substitute and Hill's bill passed without objection. Miller then asked unanimous consent to take up the California mineral bill and place it on its passage, when, much to his surprise, Cameron of Wisconsin objected. There was no debate, and the bill went over.

A Combined Knife and Pen-holder.

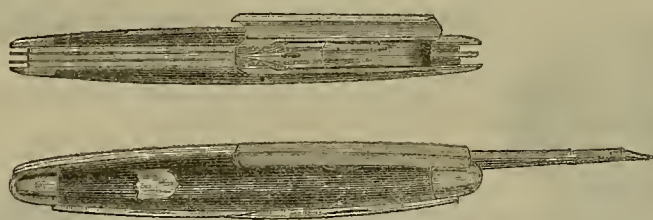
Isaac Phillips of Silver City, Owyhee county, Idaho, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency a combined knife and pen-holder, which is represented in the engraving on this page. An ordinary pen-knife forms the handle, and has in its back near one end a chamber in which a short pen-holder and pen lie. The holder is pivoted to the knife handle in such a manner as to enable it to be opened out with the pen, so that the handle of the knife will then form for it the staff, when the implement is used for writing. A hinged casing or cover is adapted to enclose the pen and its holder when lying within the chamber, whereby the dust is kept out when the implement is carried in the pocket. The object of the invention is to provide a convenient implement capable of being used as a knife or a pen, as occasion demands. One of the views shows the implement with the pen ready for use, and the other shows the pen and pen-holder folded back into the handle of the knife. The advan-



THE FULTON PATENT PULLEY.

tages of such an implement are readily recognized.

MANUFACTURERS' ASSOCIATION.—At a meeting of this association, held on Monday, the Executive Committee reported that they had engaged a room for the meetings of the association in the Merchants' Exchange, at \$20 per month, from the 1st of February. The matter of appointing a secretary who should attend exclusively to business of the association was brought up. Colonel Harney reported from the Finance Committee, to whom the matter



PHILLIPS' COMBINED KNIFE AND PENHOLDER.

had been previously referred, recommending that the salary of the Secretary be fixed at a sum not to exceed \$150 per month. The report was concurred in, and the matter of selecting a secretary was referred to the Executive Committee, with power to act. The Treasurer's bond was fixed at \$10,000, with two sureties in \$5,000 each, and the Secretary's at \$5,000, with two sureties in \$2,500 each, both of said bonds to be approved by the Finance Committee. Lewis H. Sharpe was appointed attorney of the association, and several new members were elected.

COAL.—Last month we received 70,000 tons of coal in this city exclusive of what came from the California mines. The Canton Hill mines (Puget Sound) sent 13,275 tons; Renton (Puget Sound) 3,174 tons; and Seattle (Puget Sound) 9,205 tons. The Coos Bay (Oregon) mines sent 795 tons. From British Columbia mines the following came: East Wellington, 7,600 tons; Nanaimo, 4,245; and Wellington, 10,236 tons. Of Eastern anthracite we got 2,314 tons; and there were 7,494 tons of Australian. The other 20,000 tons came from Europe.

THE Sierra Butte mine produced \$187,59 in December last, and \$212,018 for the year 1883.

Gold and Grain.

Gold and grain, it will be admitted, are important products for the prosperity of a State and people. For the past few years grain producers and operators have considered all that was worth caring for was grain, although gold was in the end the object sought. As English gold could be obtained for California wheat, California's gold product was not desirable. They could deride and kill that, destroying as well the chances of inviting gold for mining enterprises, and thus the loss by gold production and gold that would have come in for mining investments would foot up fully \$75,000,000—taking in the past five years of tirade against hydraulic mining, which, though against one class of mining, has seriously injured all classes. There now seems to be a flatter in the grain camp; the English market rates show too conclusively that failure is to be the fate of grain shippers, even at the low charter rates which as a total has caused to our San Francisco dealers an immense loss. I use

the word immense—I suppose it has a meaning when a single house fails for one and a half million of dollars. The position of affairs now is such that the whole State has not only to suffer by this grain decline, but by the loss of gold which, but for the tirade against mining, would have been produced. It is probably well enough, for the farmer will be convinced by these failures to get English gold of the value of home gold production. If he does not as yet, he soon will be, from the fact that a financial panic is merely a matter of an unsuccessful shuffle with our railroad magnates, and which is not an unlikely event any day as matters now stand in Wall street. Already the more intelligent press sees the impending

During the current year it will probably not amount to 37½ per cent. The fall has been from three-fourths down to three-eighths in four years. This is a tall indeed—a veritable revolution in commerce. The following are the official figures of the imports of wheat and wheat flour into Great Britain from the United States during the calendar years 1881, 1882 and 1883:

	1881, cwt.	1882, cwt.	1883, cwt.
Wheat from Atlantic ports.	21,746,551	20,317,230	14,229,195
Wheat from Pacific ports.	11,241,323	11,712,333	11,806,637
Flour from all U. S.	7,696,415	7,777,352	11,579,913
Totals, cwt.	40,684,289	39,806,915	37,615,745
Totals, bushels.	93,463,387	85,673,770	74,673,500

The importations from the United States, which in 1881 were over 93,000,000 bushels, fell in 1882 to 85,000,000 bushels and in 1883 to 74,000,000 bushels. That this fall is not due to a diminished consumption of foreign-grown wheat and flour in England is evident from the fact that the importations into that country are greater than ever. This is shown by the following table of imports of wheat and wheat flour into Great Britain from all countries during the calendar years of 1881, 1882 and 1883:

	1881, cwt.	1882, cwt.	1883, cwt.
Wheat	57,942,636	61,171,662	64,680,444
Flour	11,360,411	13,028,705	16,233,529
Totals, cwt.	69,303,047	74,200,367	80,913,973
Totals, bushels.	136,806,138	154,400,654	169,747,946

In 1881 the importations of wheat and wheat flour into Great Britain were little more than 136,000,000 bushels; in 1882 they rose to 154,000,000 bushels; in 1883 to 169,000,000 bushels. Thus, while the imports from the United States have steadily fallen off, those from other countries have steadily increased. There can be no doubt about it; King Wheat in America is dethroned. The next question is, Where has he erected his kingdom? Turning to another part of the official accounts before us, we find that the farinaceous monarch has hoisted his standard in Russia and British India, where he now reigns without a regret for his lost constituency in the United States. The imports of wheat into Great Britain from Russia, which in 1881 amounted to 8,000,000 bushels, rose in 1882 to 19,000,000, and in 1883 to 27,000,000 bushels; while those from British India, which were 13,000,000 bushels in 1881, rose in 1882 to 17,000,000, and in 1883 to 23,000,000 bushels.

The above figures may be considered by free-traders indicative of the intention of Great Britain to emancipate herself from her trade servitude to the United States, but they have no such import. They mean simply that the nations whose exports of grain to Great Britain are increasing are able to produce wheat cheaper than the United States can. They manage to do so with the aid of serf labor in Russia, and coolie labor in India. If the farmers of this country were ready to adopt a serf or coolie system, they might be able to withstand the growing competition of Russia and India.

Wheat growers may yet be glad to fall back on to the industry they have sought to destroy. In another respect we are a very smart people. On the one hand we do all we can to induce immigration to California, and on the other all we can to drive more away than these immigration efforts bring. This year, in consequence of our mining troubles, no less than 10,000 people will leave California for Cœur d'Alene mines, Idaho, and other sections. And here an idea suggests itself: The Immigration Society want cheap lands, houses and lots—the miners have lots of them for sale. I would suggest that all miners who want to sell their homes in order to emigrate to the new mines send in to the Immigration Society, No. 10 California St., a list of their property, cost and what they are willing to take for it. This might benefit the emigrant as well the immigrant. It would have one good effect—it would let the business men and press of San Francisco see that while they were settling on the one hand there was considerable unsettling on the other.

With the wheat crop export killed by the Russian serf and India coolie, and the gold crop of California by the California farmer, the general loss in gold will foot up at least \$30,000,000 yearly as long as conditions stand as they do at this time. Can lands enhance in value under such a showing? Can business in San Francisco expand? The fact of it is, this war against mining has got to stop, and every farmer, banker, merchant and manufacturer has got to put in a good word for it, or his own business pays the penalty. The cry that the waters must run clear will probably abate, and it is quite certain now that American wheat is dethroned as king; that when the waters do run clear in front of Sacramento and Marysville that the grass will grow in their streets from the lack of business. I hope that more justice and judgment will prevail.

ALMARIN B. PAUL.

San Francisco, Feb., 1884.

AMERICAN INSTITUTE OF MINING ENGINEERS.

The annual meeting of the institute will be held in Cincinnati on the 19th inst., when the election of officers will take place. The following nominations have been made: For President, James C. Bayles; for Vice Presidents, Eckley B. Cox, Thomas Pileston and Edmund C. Pechin; for Managers (to serve three years), Edgar S. Cook, Frank Firminstone and G. W. Maynard; for Treasurer, Theodore D. Rand; for Secretary, Chas. Kerchoff, Jr., Frederick Prime, Jr., and Rossiter W. Raymond. The address of the latter, who is the present Secretary, is lock box 223, New York. Members in good standing can send to him their ballots, choosing from the above-mentioned names.

storm, and say that mining must be encouraged; that means must be devised to prosecute even hydraulic mining—the country must have the gold. This is all well enough to talk, now they see the great loss through their own efforts to break down mining investments. In this State we are great sticklers for gold coin—everything is for gold, the farmer even works for gold. We have the greatest gold country in the world. We have produced \$60,000,000 per annum, and could produce \$100,000,000 per annum with proper encouragement; and yet the yearly product of 1883 only amounted to about \$18,000,000. What makes prosperity is money, plenty of it, and we in this State are doing all we can to have as little of it as possible; and this a serious matter when the fact is generally known that California grain will no longer bring English gold as in the past. To this end I will introduce the following article from the *Chronicle* of Feb. 2d, and then I will not be accused of creating a false alarm from prejudice. It is very instructive reading for the farmer, and is headed "A Revolution in Commerce."

The "British Trade and Navigation Accounts," received by yesterday's mail from London and containing the official accounts of commerce to the end of the year 1883, contain a genuine surprise. They prove that the supremacy of the United States in the wheat markets of England is definitely over. There can be no mistake about it. King Wheat is as effectually dethroned now, as was King Cotton 20 years ago. Four years ago the United States supplied 75 per cent of England's entire importations of wheat and wheat flour. In 1881 this fell to 69 per cent; in 1882 to 55 per cent, and in 1883 to 46 per cent.

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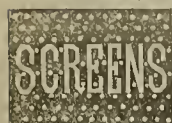


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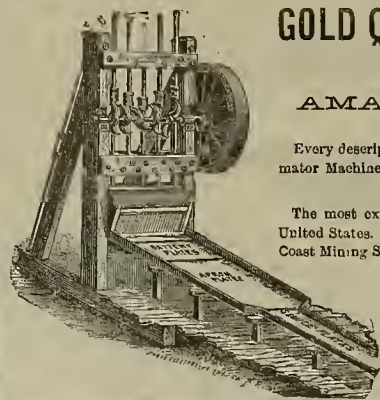
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Ingersoll, D2 3", beat National 3 1/2".....	565 " "
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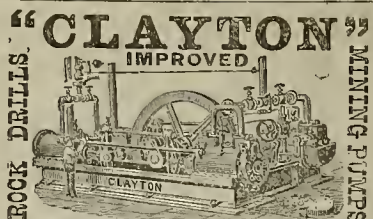
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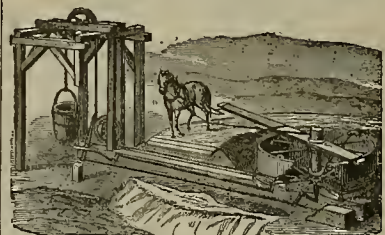
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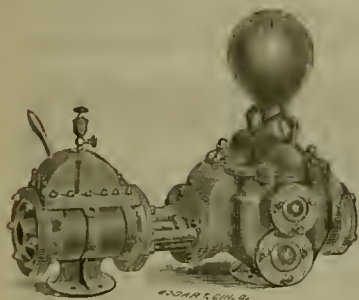
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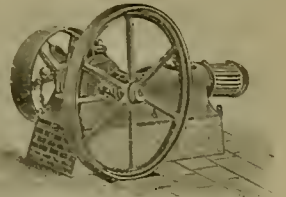
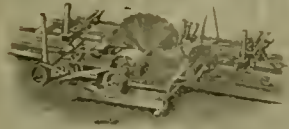
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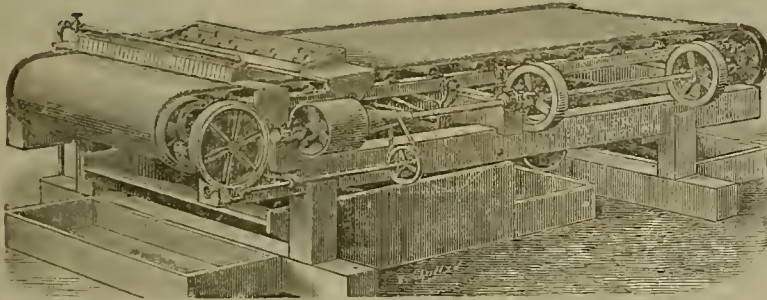
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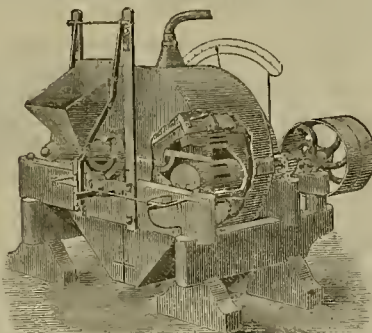
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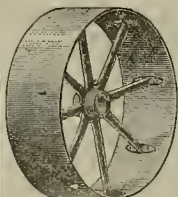
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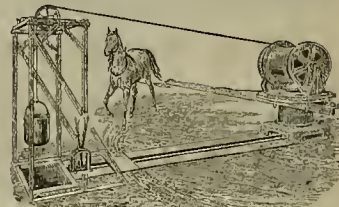
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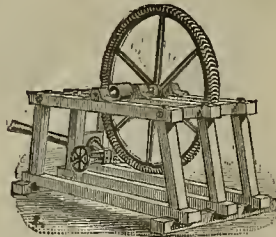
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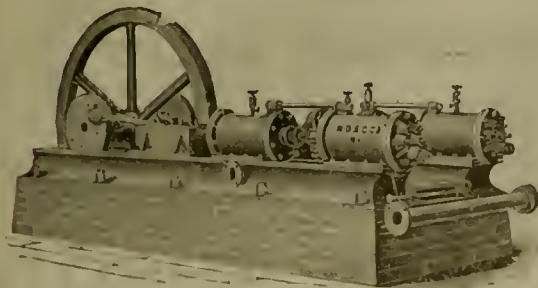
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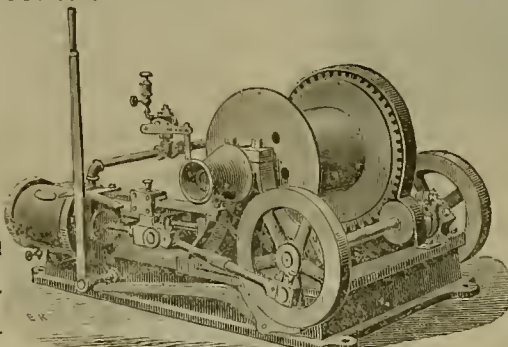
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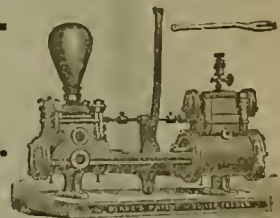
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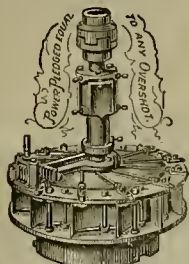
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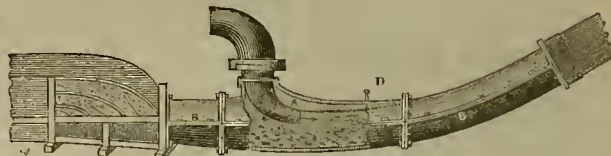
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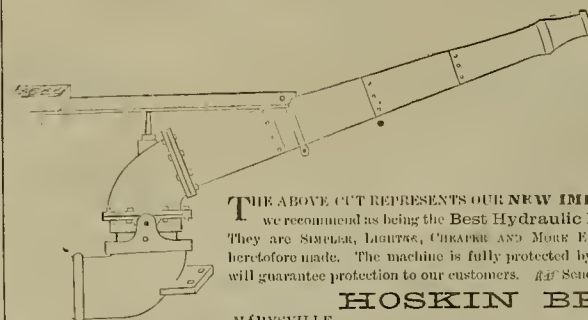
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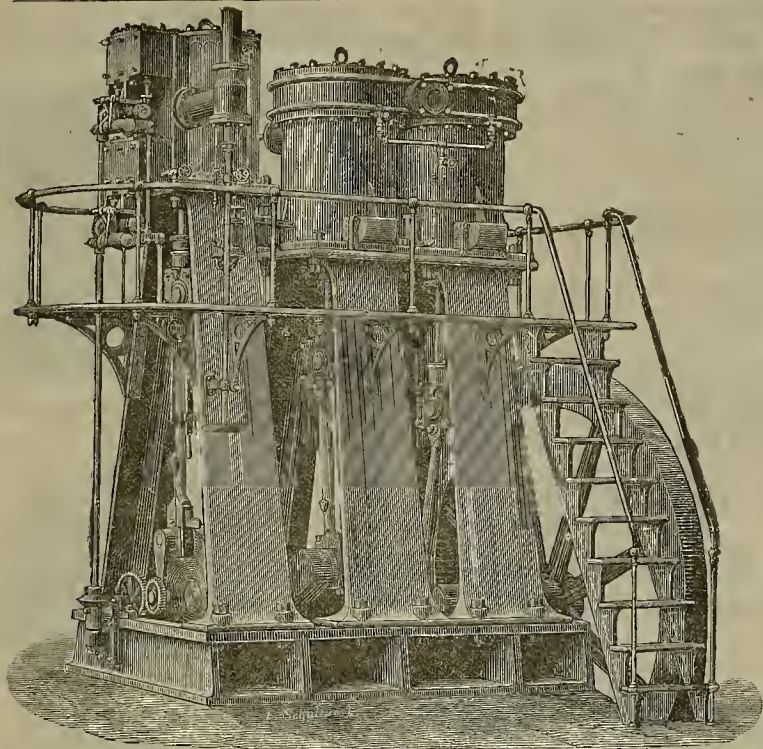
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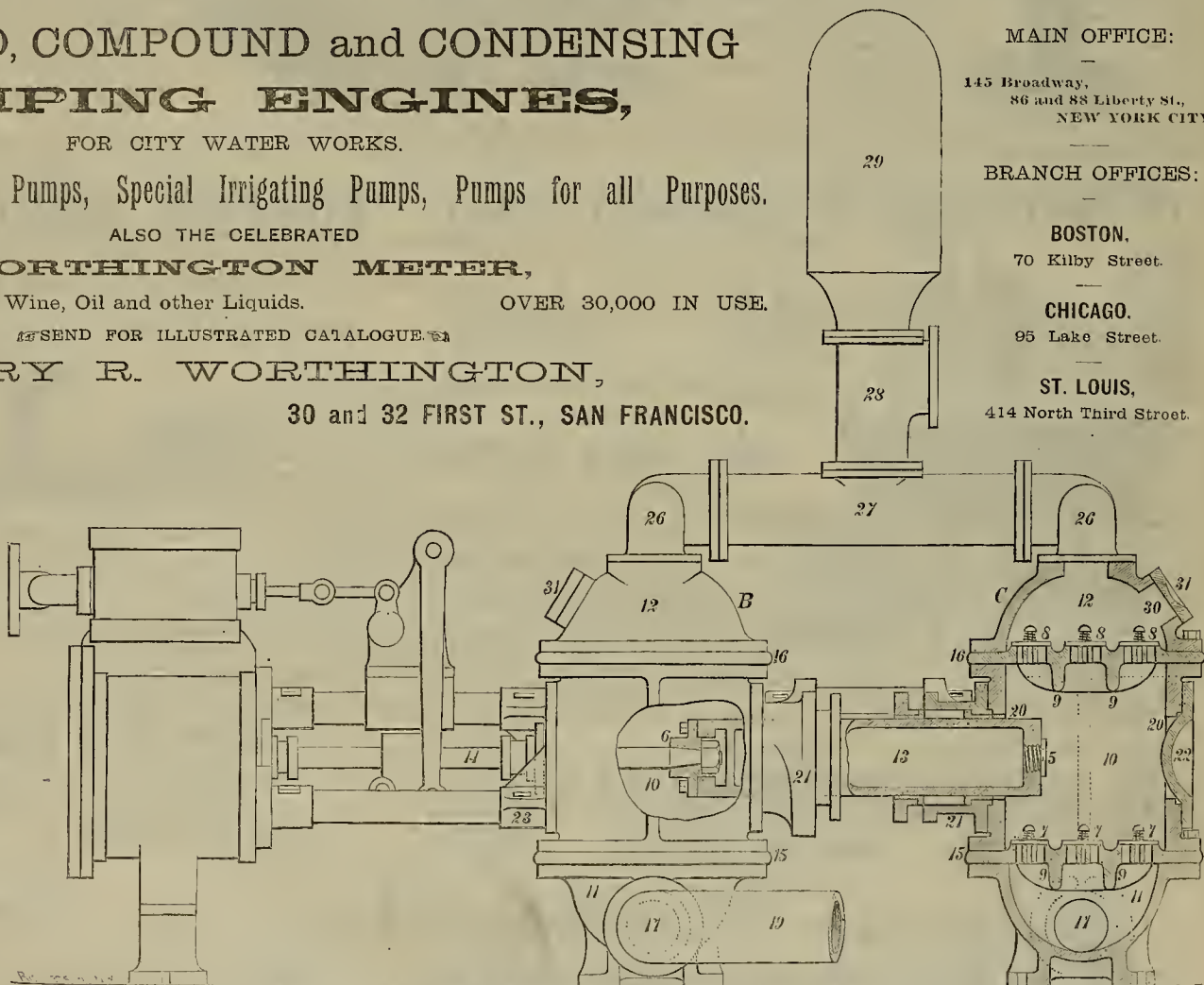
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The Lemmon Herbarium.

This Herbarium has been removed from the Blake House to a permanent place at 1205 Franklin St., near Fourteenth St., Oakland, one square east of the Post Office, where plants of the Pacific Coast, including Arizona, may be determined on application, and instruction given in botany during the winter. Sets or single specimens of the rare and new ferns of the Pacific Coast for sale.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 16, 1884.

VOLUME XLVIII
Number 7.

Wood Working Machinery.

Probably no class of machinery has shown so much improvement in the last decade as has that intended for the various processes of wood working. The machines seem to have well nigh reached perfection. The engravings on this page show two forms of surfacing machines, Fig. 1, being a 24-inch Hamilton surface planer, and Fig. 2 a 26 and 30 inch endless bed surfacer; Fig. 3 showing the sectional feed roll applied, or the lathe machine.

The Hamilton surface planer is intended especially for fine, smooth planing to a thickness. The bed carrying four idle rolls, is raised and lowered by screws and bevel gears operated by the hand wheel near the bottom. The feed consists of two feed rolls, one of them fluted, which are driven by gears and belts from the head, and started and stopped by means of the lever which operates an idler. The feed is thus all contained in and supported by the frame, so that the machine may be run without a special countershaft.

An improved pressure bar is situated close to the front of the head, a scraper is attached to the back roller, and the rollers are placed very close together so that very thin and short material may be planed. This is a very desirable feature in a planer, and is especially provided for on this machine, and with triangular shearknife head, the close rollers, etc., very short, thin and smooth planing can be done.

The patent triangular shearknife head mentioned, is driven at one end, carries three knives, and makes a shearing or drawing cut, and as a consequence does very smooth work. Material may be planed 6 inches thick, and as thin as 1-16 of an inch. The weight of the complete machine is 1,200 pounds.

In Fig. 2 is represented the 26 and 30-inch endless bed surface intended for heavy planing, and for dressing rough and uneven material. Instead of the material having only two or four driving points, and the material sliding on a long bed, causing great friction, as is the case with the roll planer in the endless bed planer, the whole bed travels, using the same friction to drive the material that in the other case retards it. The rolls and pressure bars hold the material down firmly, but offer comparatively little resistance to its motion.

The machine shown in the engraving is a heavy one of its kind, and has some new features which add to its superiority. The bed is long and heavy, 26 inches wide, and is raised and lowered in well-fitted slides by means of screws, bevel gears and a hand-wheel, and will lower sufficiently to plane material eight inches thick.

One of the improvements and the chief feature of the machine is the construction of the slides and slats. The slides are of hard steel, and are flat and true. The slats are three times as heavy as usual, being very thick at the top and having a round cored brace underneath. The sliding bearings of the slats are hardened steel plates, arranged to scrape off the dirt that may collect on the slides, and have recesses in the slat above them which are filled with waste and oil, and holes in them through which the oil reaches the slides. With this arrangement the slides and slats are kept well oiled and clean, and the chief trouble with this style of planer is overcome. The cylinder is of the patent triangular shearknife pattern, very large, and runs in extra long boxes. The feed

is driven from the cylinder shaft through an idler shaft, pulleys and gears as shown, and is regulated by means of tightener and pulley.

When the machine is to be used for planing strips or uneven material, the makers furnish Brown's patent sectional feed roll, a very convenient device for the purpose. As shown by the cut (Fig. 3) it consists of a number of sections placed upon a round bar, each section being a ring of rubber of the best quality and very flexible, covered outside with a ring of

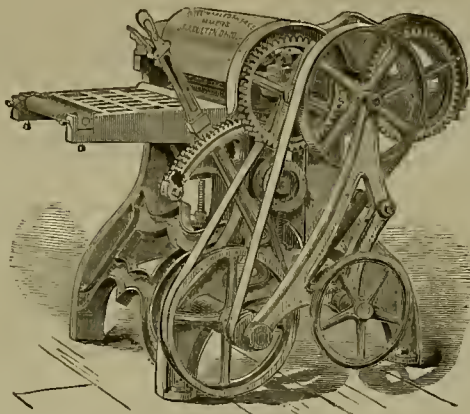


Fig. 1. HAMILTON SURFACE PLANER.

iron to protect it from wear. The inside of the rubber ring is hardened so that it will no wear if it turns on the bar, which, however, it will

thick syrup, which, by continued beating, expels water vapors to a large extent, and forms after cooling a hyaline mass. This mass is

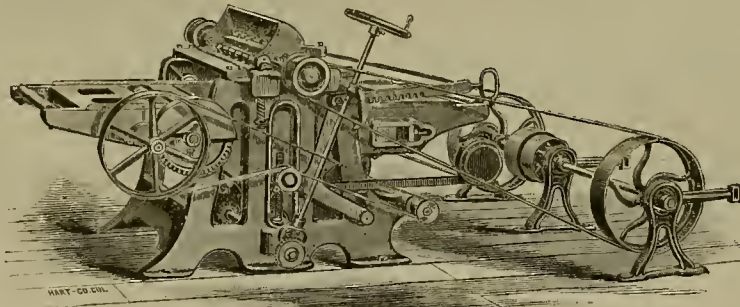


Fig. 2. ENDLESS BED SURFACER.

seldom do. This hardening next to the hole, and the iron ring are shown very plainly in both cuts, and the position taken by the roll

soluble in water, and in concentrated solution the boroglyceride can be received in crystals. The boroglyceride is now in use as one of the



Fig. 3. BROWN'S SECTIONAL FEED ROLL.

when feeding uneven material is also shown. The roll will give to very unequal thicknesses of material, and is especially useful for such work as felly strips, etc., and altogether is a very valuable improvement. The weight of the complete machine is about 3,000 pounds.

These machines are made by the well-known manufacturers of wood working machinery, Bentel, Margedunt & Co., of whom Whitney & Marshall, of 22 and 24 Fremont street, in this city, as the sole agents. This firm received the first premium and gold medal at the last Mechanics' Fair in Portland, Oregon, for their display of wood working machinery made by the above named manufacturers.

Boroglyceride.

A new chemical compound, which promises to have a great future, is the boroglyceride. It is only a short time since it was discovered that the boric acid forms with glycerine, compounds analogous to the natural fatty matter or fats, as oleine, palmatine, etc., in which the boric acid replaces the fatty acid; 100 parts of glycerine dissolved by a temperature of 180° to 220° F.; 67 parts of crystallized boric acid to a

Institute of Mining Engineers.

The annual meeting of the American Institute of Mining Engineers, occurs next week at Cincinnati. The proceedings will extend over four days. There will be addresses, reading of papers, visits to works and places of interest, a reception, banquet, etc.

The following papers have been promised for this meeting, besides others partially promised: "Physical Tests of Metals," by Arthur V. Abbott, New York City; "Sulphur Determinations in Steel," by Magnus Troilius, Nicetown, Pa.; "Tables for Facilitating the Heat Calculations of Furnace Gases Containing CO_2 , CO , CH_4 , H and N ," by Magnus Troilius, Nicetown, Pa.; "Further Determinations of Manganese in Spiegel," by George C. Stone, Newark, N. J.; "Note on the Determination of Phosphorus in Iron," by Frank Julian, Iron Mountain, Mich.; "Note Concerning Certain Incrustations on Pig-Iron," by Frank Firminstone, Glendon, Pa.; and Kenneth Robertson, Jersey City, N. J.; "The Phosphate Deposits of Canada," by T. Sterry Hunt, Montreal, Canada; "A Silver Amalgamation Mill," by G. W. Maynard, New York City; "The Test Commission Bill," by Thomas Egleston, New York City; "The Benefit Fund of the Lehigh Coal and Navigation Co.," by Joseph S. Harris, Philadelphia, Pa.

The Secretary calls attention of members to the subject of the last named paper, as one of the greatest importance and interest to mining and metallurgical industries. It is believed that many members of the Institute possess valuable experience in the matter of organizing and administering funds for the benefit of workmen, and that a comparison of opinions and results cannot fail to be generally useful. Members desiring to contribute to such a discussion are asked to notify the Secretary, and send to him their remarks in writing, if they do not expect to be personally present.

Volume XI of the Transactions has left the printer's hands, and that the copies not ordered to be bound will be distributed within a few days. The distribution of bound copies will be somewhat delayed. The Index to Volumes I-X inclusive is in the printer's hands, and a portion of it has already passed through the press. In this case also, the copies not ordered to be bound will be distributed as soon as ready, without waiting for the binding of the rest.

A DISPATCH from Walla Walla, W. T., says: The excitement about the Cienega mines is abating. The most atrocious falsehoods are being disseminated about their richness, when, in fact, old miners believe that not \$5,000 has been taken out since the camp was struck. What little has been seen is of a scaly nature, which occurs in spots. The creek is very flat and deep. No work has been done except on a high rim outside the main channel, in which bedrock has not been seen yet. The claims are 201 acres each.

EXTRA PAGES.—For the present, while our columns are crowded, we shall publish eighteen instead of sixteen pages of the MINING AND SCIENTIFIC PRESS, and shall add several pages as occasion demands. The publishers intend to make the PRESS as interesting as possible, and furnish a full quantity and variety of valuable reading matter.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Mineral Park, Arizona.

EDITORS PRESS:—Thinking some items in regard to mining affairs in this district will be of interest to some of your readers, I send you a few.

The Schuykill mine, at Chloride, is working steadily, and eleven men are mining, sacking and sorting more ore than three ten-mule teams can haul away to Kingman, a distance of nine teen miles. Purchase of the adjoining claim has just been made, and as surface indications on this claim are better than on the Schuykill it is expected that a much larger production of ore will be the result of the working of this mine. The claim was sold by Jerome Burnes to Davis & Potts for the small sum of \$1,250. The deepest shaft is twenty feet, but the vein has been opened at intervals for almost its entire length, and the showing is excellent; in one place there is four feet of solid galena and almost pure white carbonate, sampling from 48 to 51 per cent lead and 24 per cent silver. Work will be commenced at once, and it is expected that the daily production will be double that of the Schuykill. Unfortunately the latter is poorly worked owing to inexperienced management. Like nearly all other mining enterprises that have been undertaken in this district, the Schuykill has the misfortune to be in the hands of persons ignorant of the proper mode of working a mine. In a short time, under the present system, it will be in such a condition as to render it almost an impossibility to prosecute further developments of the mine.

Besides these two mines, P. F. Collins is taking out from two to three tons of lead ore per day, working two men.

The Rattler, which is a forty-foot ledge, showing four feet of lead ore, will start up in a few days, and of course the ore will all go to San Francisco.

There are a dozen other lead mines in this vicinity which have equally as good a showing as any now being worked, but which are lying idle for lack of a little industry.

The Champion mine at Cerbot has been shut down, owing to an injunction being placed upon it by the Champion Con. Co. and S. Mining Co., of San Francisco. This mine has been making regular shipments of galena ore for three months past.

The New London, at Cerbot, has suspended production in order to timber the main shaft, which is down 190 feet, and shows 5 feet of lead ore in the bottom. Other claims at Cerbot are being worked and ore being shipped.

Stockton is shipping considerable quantities of lead and silver ores.

The rich ore in the Cupel still holds out, and everyone in Stockton seems well satisfied with their progressive little mountain camp.

The Mineral Park mill will start up in a few days and run through the tailings now lying at the mill. The company will also start up the Keystone mine at once.

So that on the whole we are slowly but surely coming out of our obscurity, and are beginning to be looked upon with more respect by outsiders. We are not looking for any loom and we do not want any.

PROSPECTOR.

Mineral Park, February 1st, 1884.

A WORD TO MINERS.—The decision of Judge Sawyer, adverse to hydraulic mining, does not directly affect Tuolumne county. We have no hydraulic mines, and therefore the interest taken here in the result of the North Bloomfield suit was purely sympathetic. The result of the suit is likely, in a measure, to redound to the advantage of the mining interests of this section. Tuolumne county is fairly ribbed with gold bearing quartz veins. The stoppage of hydraulic mining will cause a lot of mining capital to be diverted into other fields. What more natural than that it should seek safe and profitable investment in the rich quartz leads of this county. No more inviting field for the mining operators can be found in the world. Our mines are numerous and rich. We have cheap and abundant water power, and our wood and lumber supply is inexhaustible, and is correspondingly cheap. This is a golden moment for our mine owners. They should exert themselves to call the attention of capitalists to the dormant mineral wealth, and the advantages which exist for its utilization in this county. With properly disseminated information regarding our mineral resources it would only be a question of time when Tuolumne would become one of the foremost mining counties in the State. This is no time to sit idle and wait for the wagon. Let our mining men blaze the trail and put their shoulders to the wheel, and we will soon have busy and prosperous times.—*Union Democrat*.

MAMMOTH PROSPECTS.—The prospects at Mammoth are exceedingly good, and the men at work on the mine feel confident of making a nice thing out of their lease. They are getting out fair grade ore, of which there is plenty in sight. It is thought by some that the mine never had a good chance to show what there is in it. But it once made a big display.—*Bodie Free Press*.

The Cœur d'Alenes.

From the Missoula Times of the 24th, we condense the following interesting information about the Cœur d'Alenes: In spite of the rosy pictures of our contemporary it is yet deemed by men acquainted with the new El Dorado that it is yet too early to join the stampede. A man who goes to Eagle City now can do nothing for the next two months. The Times says: Little else is talked of now but mines, and the Cœur d'Alene excitement is rapidly increasing. Missoula seems to be right in the midst of the "theater of war," but strangers arriving from different sections report the excitement fully as great as here, if not greater. Missoula county will witness some stirring scenes this year—the hurrying of thousands to the mines, the phenomenal building of Trout Creek City, and perhaps other towns, and the usual quota of exciting events clustering in a great mining stampede.

Messrs. Tone & Hamilton, of Trout Creek City, were in town last week doing a genuine "loud office business." They were selling lots in Trout Creek City at the rate of five, ten or twelve a day, and Agent Urlin was kept on the jump making out the transfers. In one week's time they disposed of a large portion of their lots, and each succeeding day brought a larger number of applicants than the day before. At this rate they will soon be obliged to lay out additions to the original site. The population of the embryo city is almost doubling daily, and new buildings are going up as fast as men can be procured to do the work.

It seems to be generally undisputed that the Trout Creek trail is destined to be the main thoroughfare to the mines. It is at present the only open route, and is traveled every day.

Incidents of the Stampede.

Although the stampede is scarcely begun, some curious scenes are witnessed on the line of the trail. A gentleman who just came out from Eagle City says he saw several overcoats and bundles of blankets scattered along the trail, or hung on branches of trees. The miners start out from Trout Creek City drawing toboggans loaded with their provisions, blankets, etc., and in their eagerness to get ahead, never look back, and soon getting warmed up, throw their overcoats into the snow, and dash ahead. Some were met with hags of flour, cases of coal oil or loads of bacon on their backs, and one man, named Johnson, was actually pressing forward with a sheet-iron stove on his shoulders.

There are few deer or other game in the mountains about Eagle City, the miners and prospectors having kept up the hunt for fresh meat as long as game could be found. Fish can not be caught at this season.

There are no good tools to speak of in the camp, and the miners are in greater need of good steel picks and shovels than provisions.

When Mr. L. came out he met some fifty going in, nearly all of them drawing toboggans. One man had a load of 250 pounds. He was only six miles out and was already weary, though he had not reached the foot of the mountains.

The Trout Creek trail, over which Mr. L. came, is well beaten for footmen.

A great number of nuggets weighing one, two and three ounces have been found, and several very rich quartz ledges discovered.

Pritchard creek is heavily timbered, and during a storm it is almost as dark as night, and about as dismal a place as can be imagined.

The miners are busy cutting wood, sawing lumber and digging drains.

Alum.

Native Alum.

Alum appears in the form of an efflorescence on argillaceous rocks in the Silver Mountain district, Alpine county, California, but the deposits are too light to be of much practical value. In the early part of 1875 the discovery of what was termed an alum lode was reported to have been made on Howell mountain, Napa county, California. As is often the case with these reported finds, much was claimed for the extent and purity of this deposit; but as a very little alum from that locality ever found its way to market, the first accounts of this discovery were presumably much exaggerated. Some of the springs of the Geysers group, Sonoma county, also small springs near Owen's lake, carry a small percentage of alum. Certain clays found in Santa Clara and Calaveras counties in the same State show a strong taste of alum; but if any valuable deposits of this mineral have ever been found in the Pacific division, the fact has not become generally known. Alum occurs in small quantity at Mount Vernon and in Jefferson county, Colorado. In other parts of the Rocky mountain region small quantities of the mineral are found, but nowhere in economically available bulk.

Artificial Alum.

The alum of commerce is a manufactured commodity, and the supplies consumed in this country are both of the imported article and that made in a few chemical works in the Eastern States, chiefly in Pennsylvania, New York and New Jersey, from alum shale, clay, etc. In the census year ending May 31, 1880, the production of artificial alum in the United States was 39,217,725 pounds, valued at \$808,

165. The production of artificial alum in 1882 amounted to between 16,000 and 20,000 tons, which at 2 cents per pound would be worth from \$640,000 to \$800,000. Nearly all was made from alum clays brought from France and England, but the manufactured product is said to be superior in quality to that imported from England. The process of manufacture is very simple, consisting in mixing the clay with sulphuric acid, dissolving the sulphate of alumina thus formed, and then adding a solution of sulphate of ammonia and crystallizing the resulting salt. The leading manufacturers are Messrs. M. Kalbfleisch's Sons, of New York city and Buffalo; Chas. Lennig & Co., Harrison Bros. & Co., and Powers & Weightman, of Philadelphia, and the Pennsylvania Salt Company, of Philadelphia and Pittsburg.

Academy of Sciences.

Vice President H. W. Harkness presided at the meeting of the California Academy of Sciences, on Monday evening. Donations to the museum were as follows: Ore from Cburchill county, Nev., W. S. Bell; lava which floated ashore near San Pedro, Los Angeles county, Rev. J. C. Nevin; sandstone from ocean beach, D. Barnes; fish, from W. G. W. Harford; specimens of fishes, J. S. Lanson, U. S. Coast Survey; also several bottles of small crabs; from J. H. Merry several specimens of "fluke," or *distoma hypaticum*, found on gall of sheep in Humboldt county, Cal., where many hundred sheep have been killed by them.

Dr. Behr gave a brief sketch of the life history of the distoma. A sheep that has these insects generally fattens quickly and dies suddenly. The liver fluke is an intestinal worm which is harmless to higher animals. Its eggs undergo transformation, and sometimes only one egg propagates out of nearly 4,000,000, the rest perishing before propagation. This distoma multiplies very rapidly, but not in the higher animals. In Egypt there are two other species of the distoma, which cause inflammation in the human eye or bladder.

Dr. Henry Gibbons, after asking to have the reading of his paper on the "Auroral Disturbances" postponed till next meeting, spoke on the phenomenon of red skies. He thought that the red skies at sunset were caused by volcanic eruptions, but the sun has nothing to do with it. There are strata of moist air at very high altitudes, and the redness of the sky is produced by refraction. The sky first appears a bright yellow, but as the sun sinks further the red glow appears. The red rays are the least refractive of decomposed light, but the rays are most refracted at sunset. Mr. Chas. W. Brooks spoke on the same subject, and described the course of the aerial currents around the globe by which volcanic dust might be distributed.

A resolution was adopted to the effect that the California Academy of Sciences respectfully recommend to the Governor of California the re-appointment of Prof. George Davidson as one of the Board of Regents of the University of California on the expiration of his present term of office; and that the Secretary be instructed to communicate this request to the Governor.

Several papers were submitted by title for publication, as follows:

Description of New Fish (*Squalius Lemmonii*), by Miss Rosa Smith.

Description of a New Genus (*Veatchia*), Dr. Asa Gray.

Description of New Anemone (*Anemone Grayi*), by Drs. H. Behr and A. Kellogg.

Descriptions of Three New Species of Plants, by Dr. A. Kellogg.

Description of Eleven New Species of Plants, by Rev. E. L. Greene.

Description of Three New Species of Plants, Mrs. Mary K. Curran.

Description of Three New Geneva and One Hundred New Species of Fungi, by Dr. H. W. Harkness.

Description of a New Mineral, Mr. T. H. Evans.

Astronomical Notes, George Davidson.

These papers will be published in a special "Bulletin" by the academy.

STRIKING OUT.—Twenty-four citizens of Scales Diggings, in Sierra county, have formed themselves into a company or association for the purpose of sending a representative to examine the Cœur d'Alene placer mines in Idaho. A gentleman by the name of William McDonald, an old resident of Scales and a thoroughly practical miner, has been selected as a proper person to investigate and report to the company. He left a few days ago for the mines, so as to be on the ground as soon as water starts in the spring. If the prospect is satisfactory, Mr. McDonald will secure claims, and many of the company will leave for that section in the spring. The company is composed of the following: S. M. Boyce, E. J. Sammons, H. L. Dwight, M. W. Hamm, August Rutishauser, M. B. Barrett, A. Burgan, A. Westfall, W. W. Gibson, W. Helm, P. J. Alley, Henry Kingdom, Richard Hasskins, Jas. Kingdom, Henry Skinner, John Kenny, L. J. Livermore, T. McDonald, H. Kiug, Wm. Johnson, Wm. Scott and F. Cowden.—*Mountain Messenger*.

The Plumas Eureka mine produced \$35,125 in December; and in 1883 yielded a total of \$418,459.

Bird Migration.

There is now being made, over the whole extent of the country, an effort to secure wider and more accurate information on the migratory habits of birds. This is a subject intimately connected with practical agriculture as well as scientific interest. At the first congress of the American Ornithologists' Union, held in New York City, September 26 and 28, 1883, a Committee on the Migration of Birds was appointed. It is the purpose of this committee to investigate in all its bearings, and to the fullest extent possible, the subject of the migration of birds in the United States and British North America. The work will not be limited to the accumulation of records of the times of arrival and departure of the different species, but will embrace the collection of all data that may aid in determining the causes which influence the progress of migration from season to season. For example, severe storms, gales of wind, protracted periods of unusually high or low temperature (for the locality and time of year) are among the atmospheric conditions that are known to exert marked effects upon the movements of birds. The opening of the leaves and the flowering of certain plants, with the correlative appearance of a multitude of insects, are also among the actors that have to do with the abundance of many species. Hence the careful registration of certain meteorological phenomena, and of the state of advancing vegetation from day to day, will constitute prominent items in the record books of the observer.

For the purpose of rendering the result of the season's work as full and valuable as possible, the committee earnestly solicits the cooperation of every ornithologist, field-collector, sportsman and observer of nature in North America. Indeed, a large corps of observers is absolutely essential to the success of the undertaking, and the committee hopes to receive substantial aid from many who profess no knowledge of ornithology. Efficient service can be rendered by those familiar with only our commonest birds, and the committee will gladly accept data concerning any well-known species.

To cover the wide field, the territory of the United States is divided into thirteen districts, one of which is called the Pacific Coast District, and includes Washington, Oregon, California and Nevada, and the Superintendent of this division is L. Belding, of Stockton, Cal. The home of each observer is called a Station, and is recorded by number. All persons who are willing to aid in the work are requested to communicate with Mr. Belding, and they will be supplied with a circular describing in full what data the Union desires to obtain. The Chairman of the committee which has the whole subject in charge is C. Hart Merriam, of Locust Grove, Lewis Co., New York, who has pursued the study of ornithology with zeal and success for a good many years. We hope the Pacific coast will be fully represented in the interesting investigation which is proposed.

THE ALTITUDE OF COEUR D'ALENE.—A gentleman well acquainted with this new camp says of it: The altitude of the district is much less than is generally supposed, and a great deal less than almost any of the hitherto great camps. The altitude above the sea of Lake Pen d'Oreille is 2,000 feet; that of Ratdum, 2,250 feet; and that of Eagle City only 2,300 feet. Cœur d'Alene City has an altitude of about 2,000 feet, at Lake Pen d'Oreille. Snow usually commences to fall in the vicinity of Eagle City about November 1st, and continues until the first of April. Work will be resumed April 1st and continue until the 15th of May, when the freshets, incident to the melting snows, will put a stop to mining for a month or more. It is liable to be pretty wet. Last season an immense amount of water came down from the hills into the gulches, swelling Pritchard and Eagle creeks into broad and very rapid rivers. People would do well to bear in mind that the area of the district named, which has a length of ten miles, is all that has been materially prospected. The other is not yet sufficiently prospected to enable men to know of its character.—*Virginia Enterprise*.

RIVER CLAIMS.—In the matter of the application of William Rablin et. als. for a patent for the Bear River Extension placer mine, the Commissioner of the General Land Office decided, under date of January 6, 1883, that the entry of applicants could not be allowed for the reason that "a narrow strip of land 12,000 feet long extending through sections does not conform as nearly as practicable to the rectangular system of public surveys, and if a contrary construction were given to the provisions of the Act of 1882, they could, in nearly every case, be disregarded and rendered ineffectual by placer claimants." The applicants appealed to the Secretary of the Interior from this decision and on the 13th ult., the Secretary reversed the action of the Commissioner and allowed the entry. This is a wide departure from the rule heretofore prevailing, and is an important triumph for claimants of river claims. The mine in question is owned by William Rablin, J. L. Gould, E. C. Uren and other prominent miners of Dutch Flat, and lies just above the Bear river dam, between Colfax and Cold Run.—*Auburn Herald*.

MECHANICAL PROGRESS.

The Sand-Blast Process for Files.

Since the invention of Mr. B. C. Tilghman, of Philadelphia, in 1870, of the process of ornamenting glass by the attrition of fine sand projected at high velocity against its surface, a great variety of applications of the sand-blast have been made. The inventor successfully employed it in cutting stone for building and other purposes, and it has been found an effective agent in drilling and grooving corundum, cleaning brass and iron castings, frosting and ornamenting silver and electro-plated articles, frosting sheet glass, lamp globes and chimneys, table-glass, etc. Even diamond, the hardest known substance, yields to its action. From ornamenting buttons to cutting tunnels in rock may be given, without departure from fact, as the ascertained scope of its capabilities; but, among all its other uses, there is none which would have been thought to present greater difficulties than that of sharpening files.

The chief obstacle here is the apparent impracticability of confining the action of the sand to such parts as require abrasion; but this has been overcome by a peculiarly constructed machine which throws two or more streams of sand and water at different angles, corresponding to the various markings of the file. Nozzles of various widths and directions may be adjusted to the same machine for sharpening files of different dimensions and degrees of fineness. It might be supposed that the sand would cut the point or fine edge off the teeth, but such is not the case, for smooth files are improved as much as those of coarser descriptions. The sand used is exceedingly fine, and is the waste material resulting from the grinding of plate glass. It is so fine as to be smooth and clean like fine mud.

One of the marked advantages of the sand-blast process is that it not only sharpens the files, but cleans them as well. When the work of cleaning is done by hand after the hardening and tempering, it is not only dirty and laborious, but the rate at which the workmen can clean and dry them is only about three dozen per hour. By this process, after the files leave the sand-blast they go to a boy, who passes them under a jet of hot water, which cleans out the sand and sludge, and the file, being then hot, dries of itself. A machine is now in process of construction by which files may be cleaned at the rate of thirty dozen per hour. There is a machine now in operation in Philadelphia which will sharpen from five to fifteen dozen fourteen-inch files per hour, according to the different varieties and forms, and their cutting power and working qualities are made so greatly superior by this process as to establish this as among the inventions of the highest practical value.

Bisulphide of Carbon as a Motive Power.

A patent has recently been secured by F. W. Smith, which is a device for the use of bisulphide of carbon as a motive power. This liquid boils at 157° Fahrenheit, and the vapor condenses readily at 90°. Its chemical analyses shows that the same amount of liquid should produce about six times the power of water, at a given temperature, the amount of fuel in each case being the same. Numerous attempts have been made, within the past ten years or more, to substitute the vapor of bisulphide for steam. But notwithstanding the manifest advantages which would accrue from such a substitution, all attempts have hitherto proved failures. The present, like other inventors in the field, undertakes to demonstrate that he has perfectly overcome the difficulties which have proven disastrous to those who have heretofore attempted to utilize bisulphide for motive purposes. If he can do so, he has accomplished a most important mechanical desideratum.

The *Industrial News*, published by the Inventors' Institute, of New York, says that the inventor has the process in operation in Philadelphia; the apparatus consists of an ordinary two-horse power steam boiler, the steam of which is applied at low pressure to heat the exterior surface of a small chamber of 40 or 50 gallons capacity, into which is pumped, in the form of a spray, the bisulphide liquid, which vaporizes instantly, producing any pressure required, without regard to the pressure of the steam used to heat it, the vapor pressure being determined by the amount of fluid injected. The vapor from this chamber is carried directly to the cylinder of an ordinary steam engine, producing, with the crude apparatus in use, from eight to ten horse power, the only expense being the fuel for the two-horse power boiler. The exhaust vapor is condensed by the ordinary surface condenser, returns to the tank, and is used over and over. There are no complications about its use. It is claimed that it is more easily managed than steam, and with a better constructed apparatus its effective force would be increased at least 50 per cent above that now shown.

PAPER RAILROAD CARS.—A technical journal on car building says: We do not expect to see either passenger or freight cars built entirely of metal. There are many serious objections to metallic siding, but paper compounds, or paper

in some of its forms, will doubtless be used instead, although for many years wood, from its cheapness, will hold its own against any other substances. We do not apprehend that there will be any considerable difficulty in using substitutes for wood in covering cars, but so long as the wood is the cheapest and is sufficiently strong and durable to answer the purpose, we must content ourselves with speculation in regard to the future. When strawboard can be obtained at anything like the price of wood, the siding of passenger cars at least will be much better made of paper than of wood. The size of the sheets which is easily obtainable, and the firmness with which they can be fastened to the posts, are some of the great advantages in its favor. We suppose, from what we have heard in regard to strawboard and straw lumber, that in time a single panel, extending from the door, around the corner and to the center of the car, and reaching from window sills to the bottom, can be used to good advantage. Such a construction would, of course, greatly increase the strength of the car, would be entirely free from splintering in case of collisions, and would show several other material advantages.

The Rake of Tools.

Give your lathe tools and planer tools also as much rake as you can give them for keenness without losing strength enough for the work to be done. If the top can't be given rake, then it will have to come at the bottom or sides. But if it is at the top, it will have greater tendency for a given angle of cutting edge, to let the shaving come off easily, without any power being needed to curl the latter up or to break it off at short intervals.

The greater the top rake, the greater the diameter of the curl that the shaving makes.

The greater the distance between the test part and the cutting edge, the less rake permissible on a given class of work; because the tendency to dig in will be greater.

Conversely, the greater the rake the shorter the grip on the tool, necessary to prevent digging in, springing and chattering.

As a general rule, there should be as little of the tool as possible projecting between the tool part and the cut.

Sharp interior angles should be avoided, as affording starting places for fractures.

There are some places, as for instance in turning a dove-tailed groove in a shaft, where it is usual to give the tool considerable side reach, and to have a regular corner or angle; but there would really be as much strength and stiffness, and less tendency to break, if there were more of a sweep and less of a sudden turn.

Of course, the heavier the depth of cut, the greater the power needed to side-feed the tool; and the more necessity of giving just the right amount of side rake to help the tool in, without springing or chattering.

In estimating the amount of rake required, there must be taken into consideration the question of whether or not there are soft places in which the tool would be likely to dig. The rake must be estimated for the maximum risk of gouging in.—*Journal of Railway Appliances.*

BRASS FINISHING BY ACIDS.—Many articles of brass cannot readily be finished by the file or by any abrading substances, owing to the intricacies of their surfaces. Especially is this true of brass castings of an ornamental character. But a most elegant finish can be obtained by means of acids, which may be protected, if desired, by means of a lacquer or varnish; the acid finish, however, is generally preferred without the addition of a varnish. If the work to be finished is greasy, it should be cleaned by heating and dipping in acidulated water—vinegar and water, or washing soda in water—and then in clear water. The finishing bath may be either nitric acid two parts, water one part; or one part sal ammoniac, one part sulphuric acid, one part nitric acid, one part water; all by measure, and the sal ammoniac to be dissolved in water until a saturated solution is obtained. The articles should not be allowed to remain in the acid more than ten seconds, then taken out, plunged into clear, cold water, thence into hot, soapy water, and dried in hot sawdust.

A MACHINE FOR MAKING STAPLES has been patented by S. E. Mower, of Milford, Pa. The feeding device operates to feed the wire forward a sufficient distance for the length of an entire staple. The wire is fed into a carriage having a series of receiving seats or recesses arranged about its periphery. A continuous rotary motion is imparted to the carriage, and, after the wire has been fed into one of its seats, a severing mechanism cuts off the length of one staple. The wire thus cut is conveyed by the further movement of the carriage to the bending mechanism, which gives it the customary U shape. The grooves of the carriage are of such a depth that the entire wire is imbedded therein, except at the points, which project above the seat. By the further movement of the carriage the staple is carried against cutters which remove the metal projecting beyond the seat, thus sharpening the legs. An ejecting apparatus is also employed to throw out the finished staple from its seat in the carriage.

The first balcony, or belcony, as it was originally called, was put up in Covent Garden by Lord Arundel in the seventeenth century.

SCIENTIFIC PROGRESS.

The Morality and Science of Hanging.

Executions by hanging, even when confined to the privacy of jail-yards, are revolting to every sensitive mind; but infinitely more so when conducted publicly as is done in many localities. The prior exhibition of the hideous tackle, which is often made, and coarser still, the blundering and horrible manner in which the work is sometimes done, is simply a disgrace to humanity. The baneful effect of such scenes upon a community, even when the work is done in comparative privacy, and with the utmost decorum and skill, was made painfully apparent at the late execution in this city, when thousands of men, women and children were gathered around and completely blocked up the approaches to the jail, and that, too, when every individual in that motley crowd knew before they went there that not a single individual would be allowed to witness the execution without a special permit.

If the death penalty must be inflicted, and that, too, by the revolting method of hanging, would it not be better to make such scenes still more private, witnessed, say, by only the five or six officials necessary for its accomplishment, and an equal number of citizens judiciously selected by the Court rather than by the Sheriff? Let the usual eight or ten score of other witnesses be kept out. The press is probably more to be blamed than any other parties for giving so great publicity and interest to such occasions. The sensational character of the press inter-views published before the executions, and the still more sensational accounts which appear afterwards, pandering to and unnecessarily increasing the morbid feeling which always excites the public mind on such occasions. In no way, perhaps, is the freedom of the press more abused than in its publications in regard to criminal matters generally.

It does seem as if the authorities should in some way have power to protect the public morals. How it is to be done should be a matter of serious consideration on the part of our best citizens. But so long as executions must take place, science, as well as humanity, should be invoked to do all that can be done in that direction to ameliorate the evil.

Looking at the matter from a scientific standpoint, death by hanging is produced in one of the three following ways: 1. By apoplexy, caused by pressure on the jugular vein; 2. by asphyxia, caused by stoppage of the windpipe; 3. by shock of the medulla oblongata, caused by fracture of the vertebral column. In the first two cases death is preceded by convulsions, caused by the cessation of the supply of arterial blood to the muscles, and lasting several sometimes many—minutes. In the third case death is practically instantaneous and painless, and is unaccompanied by any convulsive movement whatever.

These points were dealt with by the Rev. Samuel Haughton, M. D., F. R. S., in a paper on hanging, considered from a mechanical point of view, which appeared in the *Philosophical Magazine* for July, 1866. After carefully investigating the subject, and pointing out the more merciful nature of the long drop as against the short drop, Dr. Haughton recommended that the length of the drop should always be regulated by the weight of the criminal, and be such as to produce death instantaneously. He had ascertained that a shock of one ton dropped through one foot was just sufficient to fracture the interior articulating surfaces of the second vertebra at their contact with the atlas, and that this fracture allowed the shock to fall upon the medulla oblongata so as to produce instantaneous death. Hence he deduces the following rule:

Divide the weight of the criminal in pounds into 2,240, and the quotient will give the length of the required drop in feet. According to this rule a criminal weighing 160 pounds should be allowed a 14-foot drop. If, however, local circumstances do not permit of a drop of the requisite length, Dr. Haughton suggests that a weight should be made fast to the feet of the criminal, so as to enable the required shock to be obtained with a drop shorter than would yield it with the weight of the body alone. The matter, therefore, simply resolves itself into the means of securing a sufficiently powerful initial shock.

Having done our part in pointing out how this may be obtained, we leave the further consideration of the points we have advanced to those who are, or ought to be, responsible for the decorous and considerate conduct of criminal executions. Public decency should not be outraged, and mercy should go hand in hand with justice, even to the bitter end.

A Sensitive Thermometer.

M. Govi has presented to the Naples Academy of Sciences an ebonite thermometer supporting a capillary glass tube. This apparatus, when filled with mercury, does not show any slow elevation or diminution of temperature, but in rapid variations of heat a curious phenomenon is produced. If the temperature increases suddenly, the mercury descends in the tube and then slowly returns to the primitive level. The inverse phenomenon is produced in case of sudden cooling. The explanation is very

simple, and depends upon the approximate equality of the coefficient of cubic dilatation in ebonite and mercury. When the increase of temperature is rapid, the recipient expands suddenly and alone, consequently there is a fall of the mercury in the capillary tube. The ebonite, being a bad conductor, transmits the heat only slowly to the mercury, which requires some time to resume its primitive level. A sudden impression of cold rapidly contracts the ebonite, which crowds the mercury into the capillary tube and thus raises the level. This experiment shows the importance of paying attention to the expansion of the recipient, in reading thermometric indications.

CELESTIAL PHOTOGRAPHY.—The first application of photography to astronomy was made in France. The first Daguerrian image of a heavenly body was that of the sun, which was taken by Fizeau and Foucault, April 2, 1845. Soon afterwards fine photographs of the moon were obtained, in the United States by Rutherford, and in England by Warren de la Rue. In many observatories photographs of the sun have been taken for twenty years, to facilitate the study of the spot and faculae. More recently still, Rutherford and Gould photographed the stars, for the purpose of forming celestial charts, and Draper obtained a successful photograph of the great nebula of Orion. The large solar images, which have been obtained during the few years at Meudon, have revealed phenomena on the sun's surface which are invisible to the most powerful telescopes, and which open an entirely new field of research. By their aid we learn the true form of those elements of the photosphere about which so many different and contradictory assertions have been hazarded. In 1881, the first photograph of a comet with its tail was obtained at Meudon. It revealed curious details of structure and allowed divers photometric measurements, which showed that the tail, in spite of its apparent brilliancy, is from two to three hundred thousand times less luminous than the moon. The preservation of the images, the wide range of sensitiveness in the plates, and the facility of embracing the most feeble as well as the most powerful luminous phenomena, lead Janssen to style the photographic plate the true retina of the savant.

THE INSTITUTE OF CHEMISTRY.—By a bill to be submitted to the English Parliament next session, the Institute of Chemistry, incorporated by an Act of 1877, is to be dissolved, and to be re-incorporated under different conditions. The object of the institute is to encourage a thorough study of chemistry and the branches of science applied thereto, in their application to the arts, to agriculture, to public health and to technical industry; and for adopting measures for the advancement of the profession of chemistry, and for the maintenance of the profession of the consulting and analytical chemist on a sound and satisfactory basis. Admission to the institute is to be by examinations held from time to time, and the members will be divided into fellows and associates, distinguished by the letters F. I. C. and A. I. C. respectively, the assumption of which initials by unauthorized persons is to be punished by a fine of £20. The government body is to consist of a council of thirty-five members, including a president, six vice presidents and a treasurer. The first officers will be those holding office in the old institute at the time the act comes into operation. Power is taken to provide a library, a hall and a laboratory for the use of the members, on any resolution in favor thereof being adopted by the members in meeting assembled.—*Iron.*

CONVERSION OF LIGHT INTO ELECTRICITY.—The conversion of electricity into light is now a fact of every day utility, says Engineering, but the reverse process has been very slow of accomplishment. It has, however, been effected by Herr Sauer, whose sunlight battery has been described in the *Electrotechnische Zeitschrift*. The chemical rays furnish the power, and the battery will only act in sunlight. It consists of a glass vessel containing a solution of fifteen parts of table-salt and seven parts of sulphate of copper in 106 parts of water. In this is placed a porous cell containing mercury. One electrode is made of platinum, and the other of sulphide of silver, and both are connected with a galvanometer. When not in use, the whole is inclosed in a box. When in use, the platinum electrode is immersed in the mercury, and the other in the salt solution; the battery is placed in the sunlight, and the galvanometer needle is then found to be deflected, the sulphide of silver being the negative pole. If the sun is clouded, or any other change in the intensity of the light occurs, it is indicated by the needle. The exact effect produced by the light rays does not as yet appear very clear; but their presence distinctly produces electrical action, and their absence suspends it.

THE BALLOON AS A TELEGRAPH MEDIUM.—A method of signaling by means of electric balloons has been successfully tried in Paris by M. M. Mangin and Baudet. The balloon, made of paper rendered translucent, was about eight feet in diameter, and was filled with pure hydrogen. A swan lamp was fitted inside, and a light rope carrying two copper wires was attached. When the circuit was completed, the whole balloon appeared to be a globe of fire. By switching the current off and on, the Morse code can be spelled out, by which communication can be carried on between distant points,

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Passing Events.

The recent heavy storms have had the effect
of storing up a good big body of snow in the
mountains for the coming season. The result-
ant water will not be as useful as of yore, of
course, since in most places hydraulic mining
cannot be pursued. Still the water will be good
for some gravel mines and many quartz mines.

The excitement about the Cœur d'Alene re-
gion is unabated, and from all quarters we hear
of parties being formed to go there at the earli-
est opportunity. Men are coming into Salt
Lake by hundreds and fitting out for the new
mines. From this State many miners will go,
more especially from the region where the
hydraulic mines have been shut down.

We note elsewhere the withdrawal of the ap-
peal to the Supreme Court of the United States
in the debris case. This is only a form, how-
ever, as the appeal is by no means to be aban-
doned. Another formal appeal will be submitted
in due course of time.

As we write (Thursday) the rain is falling
freely. It looks as if the agricultural commu-
nity was to have a prosperous year.

TOMMY ROGAN tells a Montana paper that
while he was in the Cœur d'Alene country the
miners held a meeting, at which it was voted that
the first Chinaman who ventured into the dig-
gings should be hung, and not having sufficient
rope at the time to swing a man, a miner was
immediately sent out on snow-shoes to Trout
creek, where he bought forty feet of the article
and returned.

Mineral Character of Land.

John F. Krohn applied to the Government to
purchase, under Section 2 of the Act of June
15, 1880, certain mineral land at the junction
of Coarse Gold and Dead Wood gulches, in
this State. The land lies in the vicinity of
valuable mineral lands, but had been returned
as agricultural by the Surveyor-General. Still
upon tender of proof and payment by Krohn,
and protest by Henrietta Colmore, Sylvester
Hecker and Charles Limon, to the effect that
a certain part of the tract was mineral, a hear-
ing was ordered, and the local officers held that
three ten-acre tracts thereof were mineral,
namely, the E. $\frac{1}{2}$, and the S. W. $\frac{1}{4}$ of the N.
W. $\frac{1}{4}$ of the S. E. $\frac{1}{4}$ of section 5, which finding
the Commissioner of the General Land Office
reversed, on the ground that the land had been
returned by the Surveyor-General as agri-
cultural.

At the hearing, gold found on said tract was
produced, there being one nugget weighing
twenty-two dollars, and the testimony showed
that considerable gold had been taken out at
different times, including several nuggets of
greater value. The practical miners testifying
gave it as their opinion that, while the
primitive method of pan-washing would not
pay, the modern hydraulic methods undoubtedly
would. To the contrary is the fact that on
some parts of said tracts cereal crops have been
raised. The Secretary of the Interior thinks it
undeniable that a stratum of soil may cover
mineral deposits of this kind, and yet the de-
posits be valuable for mining purposes. And
he also thinks that the undisputed evi-
dences of the valuable mineral character
of the land above referred to show
that the land is not "clearly agricultural,"
as contemplated by Section 2342, R. S., and
are sufficient to warrant a rejection of Krohn's
application to purchase, in so far as it covers
the three ten-acre tracts aforesaid. The ruling
of the Commissioners of the Land Office has
been reversed, therefore, and Krohn allowed to
purchase the land.

Tamping Explosives.

Efforts are constantly being made to effect a
saving in the quantity of explosives used in
mining operations by systematic application
of the charges. The example is cited of a con-
tractor who in strong rock had reduced his
charges of dynamite and got good effect by
tamping the holes with clay. It is customary
to use little or no tamping with strong explo-
sives; the time thereby saved is regarded as
compensating the cost of the greater quantity
required. Tamping with clay pellets, prepared
by boys beforehand, occupies but little time,
and the more complete combustion of the explo-
sive and the reduced quantity employed, lead
to a diminished vitiation of the air, so that the
men may return to their work immediately
after the blast. In another instance of driving
a heading in stone, a saving of about fifty per
cent of the cost of explosives has been effected
by using dynamite in the strong holes and black
powder in the rest; the proportion in this case
is, on an average, one hole charged with dynamite
to three holes charged with black powder. Mr. George C. Andre, in his "Continental Col-
liery Notes," mentions an example of blasting
in coal which lately came to his notice in
France. The borehole was reduced as small as
possible in diameter for the purpose of distribut-
ing the pressure over a greater length with a
given weight of powder. The latter was used
in a cartridge one inch in diameter, and was of a
quick burning character. The effect was very
good, only a small quantity of "small" being
made. Much has been said and written re-
specting the relative quantities of small coal
made by blasting and by wedging, the advan-
tage being invariably attributed to the latter
method of "falling." But, so far as Mr. Andre's
observation has extended, in carefully man-
aged workings, the advantage has been decidedly
on the other side. Prejudice has led to exag-
geration in this matter, and the evils of "shoot-
ing fast" have been over-estimated.

It was thought the big \$8 assessment on
Northern Belle stock was to pay the \$260,000
judgment to the Holmes Co., but it is reported
in the *Eureka Sentinel* that it is an attempt to
"freeze out" the Holmes people who are large
holders of Northern Belle stock.

Good and Bad Roasting of Ore.

To the experienced metallurgist it is not
necessary to insist on the immense importance
of a thorough roasting of the sulphurated cop-
per ore as a preliminary operation and as a key
to its successful and economical treatment dur-
ing all subsequent processes. To those who are
not professional metallurgists, yet are called
upon to direct important smelting operations, it
may be worth while to point out the far-reaching
influence of this step, so often neglected or in-
trusted to incompetent hands. The difficulties
of smelting poorly roasted ores are innumerable.
The silica of the gangue rock, not finding suffi-
cient oxide of iron to satisfy it, forms a tough,
infusible slag, while the undecomposed sulphide
of iron simply melts into a matte, forming a
low-grade product, which requires an extension
of the subsequent processes with corresponding
costs. The difference in the cost of producing
ingot copper from the same grade of sulphide
ore, in the one case well roasted, in the other
poorly roasted, may easily make the difference
between profit and loss.

An excellent example of this may be cited by
taking certain figures presented by Edward D.
Peters, Jr., from results of work done under his
supervision. They show the cost of putting 9
tons of 8 per cent ore into ingot copper, in one
case the original ore being thoroughly, in the
other badly, roasted:

Comparative Results in Careful and Poor Roasting.

	Well Roasted.	Badly Roasted.
Heap roasting 9 tons of ore, at 50 cents Smelting the same.....	\$4.50	\$4.50
Roasting 2 tons of 36 per cent matte from well roasted ore, 3 roasts, at 50 cents per ton.....	3.00	.....
Roasting 3 tons of 24 per cent matte from badly roasted ore, 3 roasts, at 50 cents per ton.....	.....	7.50
Smelting 2 tons roasted matte, at \$2.50	5.00	.....
Smelting 3 tons roasted matte, at \$2.50	.....	7.50
Producing ingot from last matte.....	14.00	14.00
Total.....	\$40.00	\$85.00

The table of Mr. Peters shows a cost of \$5.44
per ton for the well roasted, and of \$7.22 per
ton for the badly roasted ore, thus showing the
total cost of treatment to be increased nearly
one-third through carelessness in the first opera-
tion. In reality this estimate falls far below the
real cost, as there have not been taken into con-
sideration the serious expenses that are likely
to occur from slicking up and burning out the
furnace, the formation of an increased amount
of foul slag that must be melted, and many
other annoying circumstances, all arising from
the silicious character of the slag, which, in its
turn, has occurred from the imperfect roasting
of the ore.

Salt.

Of all the useful minerals found in the Pa-
cific States and Territories none occur in such
abundance as the chloride of sodium—common
salt. Besides numerous salt springs, ponds and
lakes, this mineral exists in crystalized layers
interstratified with other substances, the whole
forming great mountain-like masses, and the
deposits occupying the beds of dry or nearly
dry lakes or wide extended marshes alkali flats,
etc. Besides the product of these natural
salines, large quantities of salt are made by the
solar evaporation of sea-water, not less than
50,000,000 pounds being produced by this pro-
cess on the bay of San Francisco every year.
The plan of producing salt by boiling in ket-
tles, or evaporating the brine in shallow pans,
by means of artificial heat, the common
methods in most countries and used extensiv-
ely in other portions of the United States, is not
practiced here. The regular strong trade
winds and sunny days of summer answer every
purpose as evaporators.

The consumption of salt on the Pacific Coast,
by reason of the many uses in which it enters,
has always been large. It is employed in a
variety of industries, all having considerable,
and some of them very large requirements. In
the reduction of silver ores, and other metal-
lurgical operations, such as the chlorination of
auriferous pyrites, between 2,000 and 3,000
tons of salt are disposed of here annually. In
dairying and meat packing, and for culinary
and other domestic purposes, and for curing
hides, fish, etc., a great deal more is used.
In various manufactures and in the economic
arts some is also needed, the consumption in
the Pacific States and Territories being ex-
ceptionally large for their population.

A convention of miners is suggested in this city.

Defects of the Mining Law.

Cannot something be done to make mine own-
ers, or rather locators, work their prospects ac-
cording to law? How many miners actually
put \$100 worth of development upon each claim
they own every year? The law requires it, but
is it done? Does not every mining man know
that in each and every one of the numberless
mining districts, from Montana to California,
there are men who hold from one to twenty
locations apiece, and who do not put a dollar's
worth of work upon any of them from one year's
end to the other? Many of these locations
promise well, and might, if a little work was
done, turn out to be paying mines.

As the law now stands, any person willing to
swear that he has performed the annual ex-
penditure required by law can hold his ground,
provided it is properly recorded, against all
comers, no matter if he has not sunk deeper
than the blade of a shovel, or only scratched
the blossom rock with a stick. If the law de-
manded that a 5x6 shaft 20 feet deep, or a 4x6
drift 30 feet long should be the amount of labor
to be performed on each 1,500 feet location in
order to hold it for one year, it would make the
drones and "stove herders" take a back seat,
and give energetic, live men a chance to come
to the front.

Of course the lazy, blumming, verminous
tramp element, whose mining is done at the
street corners and on benches in front of saloons,
will rise up as one man and howl out an al-
coholic tinctured howl that such a law would be
unjust, because some rock is hard, and other
formations are soft. But where one ledge is
found that requires blasting from the start,
there will be dozens that can be sunk to this
insignificant depth with pick and gad. If one
man's ledge requires more powder than that of
his neighbor, it is his misfortune if on that ac-
count he cannot sink to the depth required at
an outlay of \$100; while if the case is reversed
and he has good, soft sinking, so much better
luck.

Any person relocating a mine should be com-
pelled to do a specified amount of work upon it
within sixty days after such relocation; this
would head off a large crowd of Smart Alecks,
who do no work, but hold their claims from
year to year by relocating, and when some en-
ergetic man comes along and perhaps makes a
strike the law which ought to protect him, de-
spoils him of the fruits of his labor and makes
him out a robber.

Mining Claims and Public Surveys.

It has been just decided that where part of a
legal subdivision is non-mineral land, and the
gold deposit is a ravine, a location that follows
the mineral deposit conforms to the public sur-
veys as nearly as practicable. This is the view
of the subject taken by the Secretary of the In-
terior, who reverses a previous decision by the
Commissioner of the General Land Office. It
was in the case of the Esperance mines, near
Marysville, in this State. An area of 41.72
acres is embraced in said claim, and it has
a length of about two miles and a width vary-
ing from eight to seventy feet, embracing the
bed and following the meanderings of a part of the
South Yuba river and Allison's ravine. The ap-
pellant filed evidence showing that the greater
part of the adjacent land is non-mineral, that it
was at the date of location occupied and used
for agricultural purposes, and that the placer
lies between precipitous banks. For these rea-
sons it was urged that the claim conforms "as
nearly as practicable" to the legal subdivisions;
but the decision of the Commissioner repealing
that of May 19, 1873, held to the contrary.

The Secretary of the Interior, however, thinks
that the word "practicable," in Sec. 2331 of
the Revised Statutes, means reasonably practi-
cable, and that in this case it would be unrea-
sonable to require the appellant to conform his
location to the legal subdivision; therefore the
Secretary is of opinion that the claim conforms
as near as practicable to the lines of the public
surveys. The Commissioner's decision was
therefore reversed.

JOHN W. MACKAY will soon leave New York
for this coast, by the Southern route. On his
way home he will stop at the Quijotoa mines in
Arizona, in which he is largely interested.
James L. Flood will go down to Tucson to meet
Mr. Mackay, and they will examine the mines
together.

The Skinner Portable Engine.

The accompanying cut represents the Skinner mounted portable engine and boiler, built by Skinner & Wood, of Erie, Pa. The aim of the manufacturers in the construction of this engine has been to make it simple, reliable and durable. Great care is taken to use a mixture of iron that will produce a cylinder which will longest resist wear, and this result the builders claim has been reached, after careful study, many experiments and large expense, in the cylinder of the Skinner engine. The frame is cast in one piece, with cylinder head and main-shaft boxes, and on the same plane with the center of the cylinder, bringing the strain, if any, in a direct line with the piston rod, avoiding the great evil of the engine getting out of line, which is a common fault of engines built on the usual plan, having their different pieces bolted to the bed. The crank is made of heavy wrought iron and forged solid and slotted. The bed is formed to prevent any drippings from reaching the boiler by the aid of drip-pans, which are placed under the pump, valve stem, shaft bearings and eccentric. These devices deserve special attention, for they insure cleanliness. Every tidy engineer likes his engine and boilers to be clean and neat, and will take pride in keeping them so if the means are put within his reach. With these drip-pans to carry off all the oil and water through one pipe, the operator finds a few minutes' rubbing each morning all that is needed to keep his engine and boilers bright and clean. The valve is a plain slide-valve, cutting off a five-eighths stroke, and driven by eccentric. The valve rod, piston rod, pump and eccentric rods are hammered steel. The valve rod has two square bearings outside of steam chest, with provisions for taking up wear, and between these bearings connection is made with eccentric rod, insuring great durability. The piston has ring packing, which adjusts itself by steel springs, the pins and nuts of which are made of brass, as also is the follower nut, thus preventing rust. The guides and cross-head are of the locomotive pattern, and admit of wear being taken up by both upper and lower guides, thus keeping the cross-head always in line.

The pump is driven by the cross head, has interchangeable brass valves and seats, is thoroughly accessible and every part can be reached without disturbing other parts of engine. The combined check, stop and relief valve is a new feature in this engine, and one every careful engine man will appreciate. The stop-valve being so constructed that when closed, connection is opened between the pump and the atmosphere, thereby relieving the pressure if the pump is started with the valve shut. The engine has a removable piston rod stuffing box, which can be taken out any time by removing the follower nut and check nut; no matter how long it has been in service, leaving the remainder of the engine undisturbed. It is made of steam metal, very heavy and strong, and in using a follower nut to force the sleeve against the packing, the stuffing box can never be crowded out of line, or wear one side more than another. The connecting rod is made of best steel, and at each end are heavy brass boxes, held to rod by bolts. One-half the box is movable, having a projection extending into rod to the key, which takes up wear in the usual way. The box at the crank end has a large chamber for the reception of oil and waste, and at each revolution, sufficient oil for proper lubrication is thrown up through hole in upper part of chamber. This arrangement is very simple and effective, and does away entirely with spring-valves and oil cups.

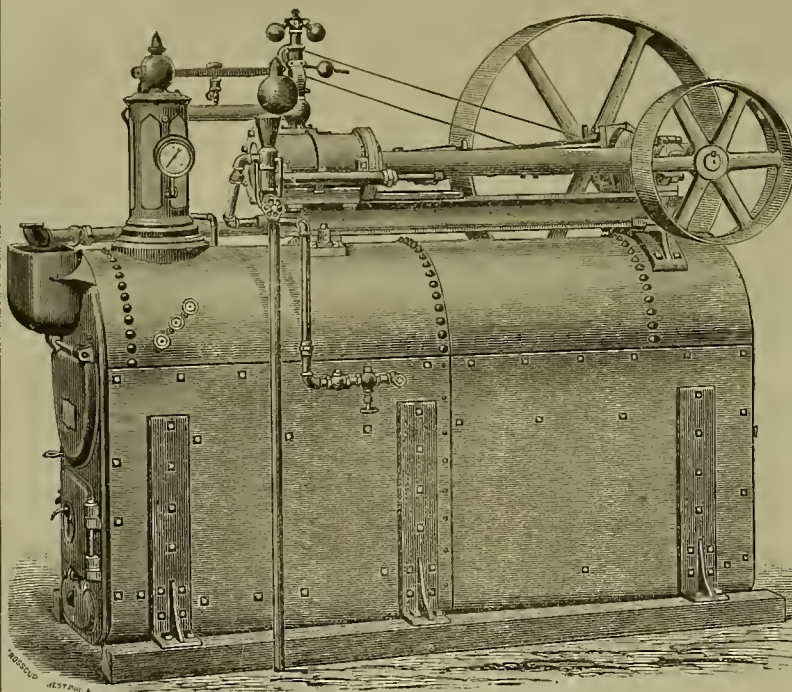
The governor used on this engine is the Skinner patent automatic stop governor. Most automatic governors require to be readjusted every time the engine is stopped. Not so with this, however; it needs no alteration, or adjustment, unless the belt breaks or runs off. The operation of this device is positive, as all of the automatic mechanism is suspended on frictionless bearings and cannot become ineffective. The framework, gearing, etc.—in fact nearly every piece used in constructing this governor, except base and halls—is made of malleable iron and steel, and the result is a machine which insures strength, is light and of symmetrical proportions.

The boiler is built upon the principle of the stationary arch boiler, having all the advantages of the stationary boiler—safety, effective steaming qualities, ease of cleaning flues, adaptability to all kinds of fuel, etc.—and at the same time none of the disadvantages of the locomotive and vertical boilers. It is made of the best wrought iron, C. H., No. 1, shell one-quarter inch thick, with three-eighths inch flange heads and three inch lap-welded flues. Instead of brick walls this boiler has a heavy wrought-iron casing, built its entire length on both sides, and with fire-brick made especially for the casing, which are clamped to the side of the fire-box. A recent improvement has been made by the builders in placing between the bricks and the casing a heavy lining of fire-proof material, which prevents radiation and keeps the casing cool. The fire is built directly under the body of the boiler, and after passing along its entire length returns again through the flues. The fire-box is very large in proportion to the size of the boiler, admitting the use of fuel that could not be used in any other small boiler. This feature is found of great service in wood-working estab-

lishments, as there is always a large amount of refuse in these shops too fine for use in the ordinary boiler with small fire space without constant firing and attention, while in the above boiler the furnace will hold a large charge sufficient to hold steam permanently. The adjustable and smoke consuming bridge wall is a specific feature found in no other boiler and covered by letters patent. It can be moved backward or forward, enlarging or contracting the fire-box and adapting it to any fuel. The air passes from below up through this bridge wall, where mingling with the smoke, produces flame instead of permitting the gases to pass up the stack unconsumed. No spark arrester is needed with this boiler, which is one of the important advantages secured by the return flue principle, and has made this boiler a great favorite throughout the Eastern States.

No cheap or inferior metal is used in either engine or boiler, and while no attempt has been made to compete in price with the well known cheap grade of engines and boilers, yet a comparison, it is believed, will testify that excellence after all is not incompatible with a low price. Plans are furnished with each outfit showing the length and location of every pipe, so there need be no trouble in getting the pipes in their proper places.

Engines are furnished either mounted or detached as preferred by the purchasers. Every part of both engine and boiler is illustrated, numbered and prices annexed in their catalogues, for the convenience of users in ordering repairs, should they be needed at any time. All parts are interchangeable and duplicates kept in stock at the works. Special care and attention is given to this department, thus avoiding any



THE SKINNER PORTABLE ENGINE.

serious delay in getting new parts should an accident occur.

Hundreds of these engines are in daily use in printing offices, machine, carpenter and wagon shops, cheese factories, grain elevators, mines, etc., in the Middle, Southern and Western States, all, without exception, giving perfect satisfaction, as the many testimonials sent the manufacturers will show.

The Stearns Manufacturing Company, of Erie, Pennsylvania, builders of single, double and triple, saw mills, iron gangs, Pacific screws and self-receding head blocks, heavy automatic and slide-valve engines; stationary and portable boilers, and general saw mill machinery, have lately established a branch house at 21 and 23 Main street, San Francisco, and have the sole agency for the sale of the Skinner engines and boilers on the coast. They are now on exhibition at the above sales rooms, and all interested are invited to call and inspect them, or write for further information and catalogues.

TIN MINE.—A dispatch from Charlotte, N. C., says: Great excitement prevails at King's Mountain, a village about twenty-five miles from here, over the discovery of a valuable mine of tin ore. The first piece assayed yielded seventy-three per cent of pure tin, while others gave an average of forty-three per cent, or 870 pounds of tin to each ton of ore. The tests were made at the United States assay offices. The veins will pay handsomely. Real estate in the neighborhood has advanced six hundred per cent, and the village people have formed a stock company, and have secured all lands believed to be penetrated by ore veins. Several Northern capitalists have promised to advance all the money necessary to construct factories at once.

A NEW building 90x200 feet is being built, in which the Judson Manufacturing Co. will put their tack machinery, so as to increase the product. The present tack factory will be used for extending the Victor Mower Works.

The Advent of Man and his History.

EDITOR'S PRESS.—During the Champlain epoch we find the first reliable evidence of the existence of man, our Creator's latest and most wonderful work, endowed with thinking, reasoning, inventive and creative faculties, such as no other animal possesses. His advent was undoubtedly heralded by great physical changes in the condition and structure of the earth. His remains, with works of art, are found associated with fossils of the mammoth mammals that were at his birth still in existence, but rapidly passing away, as the appearance of man, his superior in intellect, if not in proportion, sounded his death knell and the signal for the disappearance of his predecessor. The world was not large enough for both.

Man evidently at that time was a savage of the lowest type. He had not learned the strength of his power; he was ferocious, and lived by preying on animals of lesser strength ("the fruits of the chase"). His abode was caves and natural openings in the earth's crust. This was the infancy of his species. We next know him by his progressive works of art and implements of the chase and war. His reasoning faculties had taught him that artificial dwellings of stone and earth were more comfortable habitations than his subterranean retreats, as well as by other evidences of reasoning and creative powers that the brute creation were not possessed of. The stone age was rapidly followed by the age of bronze, culminating with the present, the iron age. We

other planetary systems, and unerringly foretells astronomical changes to occur.

"No pent-up Utica confines his powers—
The whole unbounded continent is ours."

The scope of his creative and inventive powers seem almost unlimited. Through the medium or assistance of the spectroscopic and microscope he furnishes an analytical test of the chemical properties of our light and heat-giving power, the sun. His telescope assists his visual organs. The moon's landscape, its mountains and valleys are plainly seen. Saturn's rings and Mars's fiery hue are familiar objects to his near view.

Such is man of the present age, studying to solve nature's great secrets—onward and upward, still reaching out and striving for a higher step on the ladder of fame and science. His ambition is unbounded, and will indomitable—never content and never satisfied. Has he reached the zenith of his power, the culminating point, like the mammoth mammals of the tertiary, whose maximum power and strength proved the signal of their destruction and decay? They had reached the turning point of their existence.

Man has attained a high standard of culture. Civilization and refinement will be continue to progress, or, by some great convulsion of nature or cataclysm of force, be exterminated, and a new era appear—a new form of life brought into existence, as much superior to man as man is to his predecessor. Reasoning from analogy, the future man or being should be as much superior to the present as the present is to the large mammalian brute of the tertiary, which also surpassed in a marked degree the fauna of his predecessor.

In connection with this history, it is in order to state that our former learned State Geologist, Prof. I. D. Whitney, supposed that he had made the wonderful discovery of the pliocene man, anti-dating the "man we know" by a large majority, on which Bret Harte very happily gets off his well-known squib on the celebrated Calaveras skull.

The writer having had occasion to visit Angel's Camp, in Calaveras county, shortly after the discovery of Whitney's pliocene Calaveras skull, which created such an excitement in the scientific world, and being somewhat of an amateur in scientific pursuits, he decided to interview the discoverers. He called on them at their cabin, and was invited to partake of "pot luck" (pork and beans), and during the meal these festive miners seemed in high glee and talking of a nice job that they had put up on "Old Whitney," as they irreverently termed him. It seems from this conversation that they had found an old and very antiquated looking skull (probably that of an Indian) in some shoal places where they had been working, and as a joke took it to the resident physician of the camp (Dr. Fisher, I think) and represented that it was found at the bottom of a deep shaft which they had been sinking; they not for a moment thinking that it would set the whole scientific world agog and render themselves famous as discoverers of so important a find. The doctor to whom the skull was taken, implicitly believing the statement, sent the skull with its history to Prof. I. D. Whitney, who was in San Francisco at the time. Prof. Whitney immediately proceeded to investigate its origin, he visited and examined the shaft from whence the skull was said to have been taken, and decided that it was undoubtedly pliocene and the earliest evidence of man on earth. A cruel hoax.

N. MAN.

LXOTYRE.—This is the name given to the latest development of the photographic art by its inventors, Messrs. Brown, Barcus & Bell, of 31 Bolt street, Liverpool, who have forwarded us some examples of the results of the new process. We are not in possession of the details, but it is stated to be a process by which a printing block, etched or engraved on zinc, and ready for use on any printing press, can be produced by photography and machinery from any object which can be photographed, this being done without the aid of a draftsman or engraver. The manipulation is said to be so rapid as to render the process applicable to the illustration of daily newspapers. The specimens sent, which consist of views and portraits, are soft and effective, and although they are not to be classed amongst high art illustrations, they nevertheless indicate the process to be available for general purposes, and especially in connection with newspapers.—*Iron*.

OUR FROZEN MILLS.—The present intensely cold weather keeps the wheels of the mills on the Carson river locked in ice. In the valleys along the streams it freezes much harder of nights than it does up here on the mountain. A mill using water from the Sastro tunnel would be all right at this season, even when the mercury was frozen solid. As things are, our people can only bide their time, and consider how much better off they are than our fellow countrymen on the Ohio river.—*Virginia Enterprise*.

The new Arizona mining camp, Quijotoa, is becoming civilized. It now has a justice of the peace, a lawyer, an assayer and two deputy sheriffs. The Arizona papers say for men not to come to that camp looking for work. There are plenty of men there now.

OUR readers who are thinking of coming to Colorado for work had better stay at home.—*Colorado Mining Review*.

The Profits of Mining.

Mining must pay. It does pay. There is no business of its magnitude that requires so little capital at the outset. It sometimes uses up a good deal of money before there are any returns, but this money is contributed voluntarily by a confiding public, always willing to risk a little in Fortune's wheel. The laws concerning the occupation of mineral lands are very liberal. There is trouble in finding good locations, but comparatively little trouble in securing the right to occupy and work them. The location secured, the only other thing to do is to incorporate and go to work. It is just as easy to incorporate with \$10,000,000 capital as \$1,000,000, but it is hardly necessary to mention that circumstance in these days, when so many mining companies parade their \$10,000,000 capital on paper. There is no difficulty in getting money to work a mine whose merits can be demonstrated. The means for working many claims are obtained solely through a belief that they will turn out well. There may be the poorest kind of reason for such a belief, but reason sometimes has little to do in the matter. The main point is to work the stock to advantage, and there will be plenty of capital to work the mine.

It is sometimes said that for every dollar got out of the mine in the way of legitimate profit, a dollar has gone into the mine in defraying the cost of working the same. Mining is justified even under that poor view of the situation. The enterprise, as thus carried on, entails no loss, and at the same time it feeds and clothes thousands of the human family, and indirectly vivifies many branches of business. The old dollar put into the business does not lose its identity, and when it again comes to the surface it brings with it a new dollar, and so we have two dollars where we had only one before. Now if the old dollar did any good in feeding and clothing those who earned it, the dollar created by its use will just double the ability for feeding and clothing those who come after it. If he can be called a benefactor who makes two spears of grass grow where before there was only one, the miner who doubles the number of specie dollars in the world is certainly entitled to an equal amount of credit. Besides the wealth which he creates has a greater permanence, since coin outlives many other human products, and is thus a source of perpetual joy and blessing.

Perhaps if capitalists had been asked on the 1st of January, 1883, to contribute \$100,000,000 in order to produce the \$100,000,000 in gold and silver taken out of the mines in 1883, they would have declined the proposition with thanks. The miners understand this thing, and do not solicit capital in that way. They have gone about their business in a more quiet and effective manner. They have developed the \$80,000,000 or \$90,000,000 or \$100,000,000 in gold and silver without creating any alarm among capitalists that they were giving an old dollar for a new one. Many claims paid dividends last year without a dollar's cost to the owners. Others paid their own expenses from the proceeds of the ore taken out and worked. Others paid in part and stockholders made up the difference by assessing themselves for the required amount. Still others had to be worked entirely on the assessment plan. Thus far the gold and silver discoveries of the country have been almost all found in that section west of the Mississippi river. Below will be found a list of the dividends paid in 1883 by the incorporated gold, silver and copper mines of the country, from our own records and from other sources:

Arizona.

	Dividends.	Amount.
Contention Consolidated.....	6	\$375,000
Copper Queen.....	4	300,000
Silver King.....	7	175,000
Total Wreck.....	1	50,000
Total.....	18	\$1,100,000

Five of the Contention dividends were paid in the first five months of the year, and the last in December. The Copper Queen paid quarterly. The Silver King paid six dividends in the first six months, and the other in December. The Total Wreck paid its dividend at the East in the early part of the year.

California.

	Dividends.	Amount.
Black Bear Quartz.....	2	\$12,000
Bonanza King.....	2	41,000
Bulwer Consolidated.....	5	35,000
Idaho Quartz.....	7	34,100
Indian Springs Drift.....	1	1,000
Jackson.....	1	5,000
Napa Consolidated Quicksilver.....	1	10,000
Mt. Pleasant.....	3	90,000
Plymouth Consolidated.....	7	350,000
Plumas Eureka.....	2	40,625
Sierra Buttes.....	2	61,250
San Francisco Copper.....	2	5,000
Standard Consolidated.....	13	325,000
Total.....	48	\$1,009,976

The Black Bear Quartz paid in May and December. The Bonanza King paid one dividend at New York a few months ago, and the other at San Francisco in December. The Bulwer Consolidated paid four of \$5,000 each in the first four months, and one of \$15,000 in July. The Indian Springs Drift paid last February and the Jackson last March. The Napa Consolidated Quicksilver paid in November, and is the only Quicksilver Mining Company in America that paid a dividend last year. The Mt. Pleasant is credited with \$30,000 in December, and \$60,000 previously. The Plymouth Consolidated commenced in June and paid \$50,000

per month for the remainder of the year. The Plumas, Eureka and Sierra Buttes paid semi-annually in London. The San Francisco Copper paid last January and February. The Standard Consolidated gave an extra dividend at Christmas.

Colorado.

	Dividends.	Amount.
Amie.....	1	\$25,000
Bassick.....	2	200,000
Boreel.....	1	18,000
Carbonate Hill.....	2	60,000
California.....	1	7,500
Catalpa.....	1	16,250
Colorado United.....	1	10,000
Dunkin.....	1	10,000
Evening Star.....	2	50,000
Henrietta.....	1	27,000
Iron Silver.....	3	300,000
Little Chief.....	1	20,000
Leadville.....	4	80,000
Morning Star.....	3	75,000
Prussian.....	1	15,000
Silver Cord.....	3	225,000
Smuggler.....	3	42,000
Total.....	31	\$1,200,750

The above mines are all incorporated in Colorado or New York, where most of the dividends are paid. The California, Colorado United and Henrietta are London incorporations, where the dividends are paid. The Silver Cord is a Philadelphia incorporation, and the dividends are paid there. The Smuggler is a Leadville incorporation. These Colorado dividends are copied from the New York *Mining Record*.

Dakota.

	Dividends.	Amount.
Deadwood-Terra.....	1	\$20,000
Father de Smet.....	5	100,000
Homestake.....	12	525,000
Total.....	18	\$645,000

The Deadwood-Terra paid last January and the Father de Smet in January, February, April, July and December. The Homestake paid 40c per share in the first nine months and then 20c per share.

Georgia.

The *Mining Record* credits Consolidated Gold with six dividends of \$4,000 each, the last one being paid in October.

Idaho.

	Dividends.	Amount.
Castle Creek.....	7	\$34,000
Holyoke.....	7	43,000
Juniper.....	1	2,000
Shoshone.....	1	3,000
Total.....	16	\$85,000

These Idaho dividends are extracted from the *Mining Record*. That of the Juniper was paid in December. Idaho promises to do still better in 1884.

Michigan.

	Dividends.	Amount.
Atlantic.....	1	\$30,000
Calumet & Hecla.....	4	2,000,000
Central.....	2	60,000
Osceola.....	3	150,000
Quincy.....	2	380,000
Total.....	12	\$2,670,000

The Calumet & Hecla leads all other mines in dividends at present.

Montana.

	Dividends.	Amount.
Boston & Montana.....	1	\$10,000
Hecla Consolidated.....	12	180,000
Hope.....	3	67,824
Lexington.....	1	220,000
Original.....	12	36,000
Total.....	39	\$513,824

The Lexington is a French corporation and its first and only dividend was paid in Paris as above. The Hope pays in St. Louis and the Boston & Hecla in Boston. The Original pays at Butte.

Nevada.

	Dividends.	Amount.
Indian Queen.....	1	\$15,000
Kentuck.....	8	24,000
Mt. Diablo.....	4	50,000
Navajo.....	5	125,000
Northern Belle.....	4	160,000
Richmond Consolidated.....	3	270,000
Total.....	25	\$584,000

The Indian Queen pays in Boston and the Richmond Consolidated in London. The Kentuck paid in the first seven months and again in December. The Mount Diablo paid its first and only four dividends in the closing months of the year. The Navajo has not been paid since May or the Northern Belle since April.

New Mexico.

The only dividend mine in New Mexico, so far as this office is advised, is the Sierra Grande, which paid five dividends of \$500,000 in Philadelphia last year.

Utah.

	Dividends.	Amount.
Christy.....	2	\$12,000
Crescent.....	2	120,000
Cosmopolitan.....	1	50,000
Horn Silver.....	4	1,100,000
Ontario.....	4	300,000
Total.....	13	\$1,582,000

The Christy paid in January and February, and the Ontario in January, and in the last three months of the year. The Horn Silver pays quarterly in Boston. The Cosmopolitan and Crescent pay at Salt Lake.

Foreign Mines.

The Jocuissita mine in Mexico is largely owned in this city, and paid four dividends of \$200,000 in 1883. The Oxford gold mine in Nova Scotia paid three dividends of \$15,000 last year.

Recapitulation.

Annexed is a condensed statement of the above dividends, showing the number of mines contributing to the grand total:

Locality.	Mines.	Dvds.	Amount.
Arizona.....	4	18	\$1,100,000
California.....	13	58	1,009,976

Colorado.....	17	31	1,200,750
Dakota.....	3	18	645,000
Georgia.....	1	6	24,000
Idaho.....	4	16	85,000
Michigan.....	5	12	2,670,000
Montana.....	5	39	513,824
Nevada.....	6	25	584,000
New Mexico.....	1	5	500,000
Utah.....	5	13	1,582,000
Total America.....	64	231	\$9,915,050
Mexico.....	1	4	200,000
Nova Scotia.....	1	3	15,000
Totals.....	65	238	\$10,130,050

As will be seen, the above dividends have come out of 66 mines, scattered in eleven States and Territories in the United States and two outside. We regret that we have not as complete a record of assessments for the same year. We have endeavored for many years to keep a record of the assessments on all companies publishing their notices in the San Francisco papers, but of course this does not include all the mines in the Pacific States and Territories, and it does not include any of the mines in Colorado, Montana, Michigan or Georgia. It may be that there are no assessment mines in those States. So far as known the Colorado mines are all unassessable.

According to a statement of assessments becoming delinquent in 1883, published in the *Bulletin* and in the *MINING AND SCIENTIFIC PRESS*, Jan. 17th, the gross amount called for by 148 mines was \$5,885,084. Conceding that all this money was collected—which we know was not the case—there would still be a large margin profit on the business as a whole, since over against these claims from 148 mines we have a record of upwards of \$10,000,000 in dividends from sixty-six mines. Apportioning the assessments in 1883 to the States and Territories paying dividends in that year, we have the following comparison:

	Assessments.	Dividends.
Arizona.....	\$165,500	\$1,100,000
Alaska.....	20,250	
California.....	1,196,044	1,009,976
Colorado.....		1,200,750
Dakota.....	10,000	645,000
Georgia.....		24,000
Idaho.....		85,000
Michigan.....		2,670,000
Montana.....		513,824
Nevada.....	4,244,400	584,000
New Mexico.....		500,000
Utah.....	52,000	1,582,000
Total American.....	\$5,088,284	\$9,915,050
Lower California.....		4,500
Mexico.....	193,000	200,000
Nova Scotia.....		15,000
Total.....	\$5,885,784	\$10,130,050

It is possible that some assessments on Arizona mines have been omitted, while it is morally certain that in the case of one or two included in the above total, the money called for was not all collected. Some time ago an Arizona paper stated that the Grand Central mine had paid several dividends this year, but our last record of a dividend for that mine was in December, 1882. The showing for California in the above table is not flattering, but the actual facts, if they could be brought out, would be more favorable. It is known that the assessments on the Noonday, North Noonday, and Red Cloud mines, included in the above total, and nominally amounting to \$300,000, were not collected, and the creditors had to take the mines to cover their obligations. It is probable that some of the assessment money credited to Nevada was not collected. But we are satisfied that poor as last year is considered to have been, the mining industry paid its way quite as well as any other having no more capital at stake, and that the profits were quite as good as most classes of business showing no larger volume. It will be noticed that we have not recorded a single dividend from a California gravel claim in 1883, and these claims must have made some money, despite all their drawbacks, from the litigation growing out of the debris question. The gravel claims will not be entirely abandoned, though at present apparently deserted.

The dividends for 1883 make prominent the copper industry of the country. The Michigan copper mines disbursed nearly 25 per cent of the above total. One of these claims paid \$2,000,000 of the \$2,670,000 paid by the whole six. This is the Calumet and Hecla, which is reported to have paid its stockholders to date the magnificent sum of \$24,350,000. In the earlier years of its history this mine collected \$1,200,000 from stockholders. In the matter of the amount of dividends paid, the Calumet and Hecla stands third in the record of American dividend mines, it being outranked only by the California and Consolidated Virginia. An Arizona copper mine paid \$500,000 in dividends last year, and a California copper mine paid \$5,000. Thus it will be seen that 8 copper mines paid \$3,175,000 of the \$9,915,050 paid by the 64 mines in this country last year. Outside of the copper interests the Utah mines show the best record of dividends for 1883. The Horn Silver and Ontario mines in that Territory have proved to be valuable properties. The dividend record for 1883, so far as we have been able to trace it, compares as follows with the previous two years:

Mines.	Dividends.	Amount.
1881.....	60	\$13,653,400
1882.....	64	13,308,150
1883.....	66	10,130,050

It is hoped that the year 1884 will show a larger total of dividends than 1883.—*Bulletin*.

The total shipments to San Francisco of coal from the Carbon Hill mines, Washington Territory, during the past year was 140,135 tons.

Carbonate of Soda.

This mineral abounds throughout most parts of the Great basin, the extensive alkali flats which form a feature of that region constituting the principal sites of these deposits, which occur usually in the form of an efflorescence an inch or two thick on the surface, but sometimes in strata a foot or more thick imbedded in the earth, and separated from each other by thin seams of clay. When found in the form of a thin incrustation on the surface it is never pure, being always admixed with salt, borax, lime, magnesia, and other minerals. The heavier deposits are comparatively free from foreign matter, carrying generally about 90 per cent carbonate of soda. One of the most remarkable repositories of this mineral known consists of a circular basin, the bed of a former lake situated on the southerly margin of the Forty-mile desert, Churchill county, Nevada. This basin, which covers an area of ten or twelve acres, is depressed 60 feet below the common level of the country adjacent. Its bottom, usually dry, though in wet seasons covered with a few inches of water, is composed of a compact mass of the carbonate of soda so hard that it has to be broken out with crowbars, and so pure that it can for many purposes be used to advantage in its natural state. This substance occurs here in layers about one foot thick, separated from each other by thin seams of clay. Large quantities of the crude material are extracted every year. Some of this is used as it comes from the mine in the beneficiation of silver ores, much the greater portion however being refined and sold for other purposes. The process of refining is effected by placing the raw soda in reverberatory furnaces and subjecting it to a heat of 500° Fah., whereby most of the moisture and excess of carbonic acid it contains are driven off. This deposit has been worked over an area of several acres to a depth of 10 or 12 feet without showing any signs of exhaustion. The receipts at San Francisco during the two years ending with June 30, 1882, amounted to 16,457 centials.

Bicarbonate of soda, nearly pure, is said to occur in a large bed 30 feet thick and covering an area of over 300 acres, in Carbon county, Wyoming. No analyses of the soda are published, and in the absence of positive evidence it seems probable that the soda is in the form of sulphate, containing some bicarbonate. From the lake near Pacific springs, Carbon county, a portion of the salt showed:

Sodium sulphate.....	\$1.23
Sodium bicarbonate.....	14.32
Sodium chloride.....	3.95
Total.....	100.00

From two miles east of Independence Rock, in the Sweetwater valley, the deposit contained:

Sodium sulphate.....	73.17
Sodium bicarbonate.....	22.98
Sodium chloride.....	3.85
Total.....	100.00

Mr. Bailey, Territorial Geologist of Wyoming states that in a distance of 75 miles from Independence Rock there are over 100 soda lakes, which vary in area from 20 to 300 acres and in depth from 15 to 45 feet, and that the soda occurs as a mixed carbonate and bicarbonate.

Not a Good Year.

We would rise to remark and stand up to explain that this will not be a good year for silver mining companies formed on the wildcat plan. The feeling is again 'em. An old bull on Wall street, who has bought a little of everything ever sold on earth, was saying the other day: "Gentlemen, if a man says silver stock to me he has got to die!"

"Don't you believe the prospectuses?" "If President Arthur had his name to one, and General Grant, Jay Gould and Russell Sage guaranteed the stock worth twice its face value, I wouldn't pay ten per cent for it!"

"But there is paying silver stock." "Possibly; but I should want to see the hole in the ground; I should want to go down the shaft; I should want to reach up and knock down half a ton of the stuff, carry it to the assayer, hold a cocked revolver to his head, and have his certificate written on parchment, before I would invest a dollar. Then, before I could credit the fact of a dividend, I should want some one to swear that I was sane, two others testify that I was sober, and a fourth man spike the money down to the table, so that it couldn't blow away!"—*Wall Street News*.

COINAGE OF THE MINT.—The coinage of the San Francisco Mint during the last month amounted to \$1,910,000, of which \$1,660,000 was in double eagles, \$200,000 in standard dollars and \$50,000 in dimes. From July 1, 1883, to January 31st, the Mint's coinage amounted to \$9,756,000, of which \$6,040,000 were in double eagles, \$416,000 in half eagles, \$3,250,000 in standard dollars and \$50,000 in dimes. In addition, the mint coined for the Hawaiian Government \$300,000 in Hawaiian half dollars and \$125,000 in Hawaiian quarter dollars last November and December.

The case of the New York Mining and Milling Company vs. the Amador Mill Tunnelling and Mining Company has been dismissed by Judge Sabin in the Circuit Court. The suit was brought by the plaintiff on account of a dispute over 600 feet of ground between the two parties.

Outlook in Calico Mines.

The general outlook of the mines of Calico district is improving considerably of late. The principal mine in the camp, the Silver King, is looking better than ever. The lowest operations in the mine are at a depth of nearly six hundred feet, and from that level a large quantity of rich ore is being taken daily. The evidences are increasing daily that the mine is becoming richer as work continues downward. It will be years before the present bodies of ore now known to exist in the mine are exhausted. There are seventy men to work, and everything is progressing systematically and smoothly under the satisfactory management of Mr. D. Bahten, Superintendent of the mine. The Bismarck is still turning out ten or twelve tons a day of ore that pays the company a good profit, and the Humburg is constantly quarrying out ore in large quantities and increasing the small mountain of the same on the dump, which at the lowest estimate is valued at about \$250,000, which will warrant the erection of a mill by the owners, and which is still in contemplation. The Garfield has a good force of men at work, and continues to sustain its reputation for excellence by turning out thousands of dollars of silver bullion every month. Mr. Raymond, the owner of the Garfield, is making arrangements to commence operations on the Occidental, which once looked so well, but which has been lying idle. It is the opinion of many that this mine will again show up well if properly mined. The Little V never fails to give good returns from every shipment to the mill, although it takes a large percentage of the yield from their ore to pay for the milling and mining. The Comet is making itself visible with brighter showing than ever. There are several leases on this mine and all the parties are making rich strikes. There are several leases on the Kearsage mine and room for a number or others, as the mine is a good one from one end to the other. The Bailey brothers have realized \$5,000 or \$6,000 within the last few months from the portion they leased, and the prospects are the other lessees will do as well if not better. The owners of the two last-mentioned mines are operating their mines in a most sensible and miner-like manner, by subdividing their claims into portions that can be properly developed by the parties leasing the same, instead of leasing their whole claims to parties who have not the means to properly develop fifty feet of the ground. It is hoped that some day some of the amateur miners holding claims that they are unable to work themselves will see the wisdom of this policy and lease their mines in small lots, thus giving poor men a chance, and enabling ten men to work where there is one at present. It will also greatly increase the value of their properties, if they prove to be worth anything at all after fair trials.

The Gobbler mine has but a small force of men at work, and, although it does not look so well as in the past, yet it may show up in fine shape again. The chloriders on the Silver Odessa are doing well, and it is thought by some that property will again be brought into prominence by rich developments. The Blackfoot has yielded a small fortune to its present owner, and is still looking well. The Sam Houston, No. 3, although it for some time seemed to have been exhausted of the precious metal after Mr. R. B. Johnson realized about \$30,000 out of it, yet on his return the magic touch of his pick revealed another rich deposit and resulted in the sale of the mine to Mr. Chas. Kaufman, who considers that he has a good piece of property, and is developing the mine in good shape with encouraging results. The Cuba, No. 1, is still paying its industrious and wide awake owners handsomely, and will be a good piece of property for chloriding for some time yet to come. The boys can go to Santa Monica and have a royal time and on their return still have a modest bank account to draw from. The Snow Bird after passing through many trials and tribulations is now fairly established as a permanent and paying mine, and with the milling facilities of its own which it soon will enjoy, it will undoubtedly make a record that will astonish the most sanguine. Work is still progressing on the Golconda and the mine is being carefully developed in a small way, but the owners are hopeful of discovering rich leads that will yield each a competency. The Burning Moscow, a fine piece of property, will soon be swelling the weekly bullion reports, and when the law-suit over the Mammoth mine is finally terminated, then that bullion producer will still further augment the silvery stream that is beginning to attract so much attention in mining circles all over the coast. The work on the Mountain Brow is progressing with encouraging results, and a number of chloriders on other claims are delving for the precious metal, mostly with hopeful results. In brief, feelings of hope and encouragement, confidence and positive assurance, imbue the minds of most of the miners and property owners in the district, and the indications are strong that our camp is on the eve of a bright and prosperous future, even though the agricultural districts of our fair State are threatened with drought and short crops.—*Calico Print.*

Belknap, M. T., is made the principal point of debarkation for the Cœur d'Alene mines. A wagon road is completed twelve miles, and will be pushed on to the mines, a distance of 28 miles, and a line of stages put on at once.

USEFUL INFORMATION

Tanning by Electricity.

Making leather is now essentially the same in principle as it was in the days of the Pharaohs. Improvements have been made in the methods of depilating, or removing the hair, from hides and skins, and machinery helps to forward the work in both tanning and finishing, but the aid of a vegetable astringent—tannic acid—is necessary in combination with the gelatine of the hide to make true leather. And this is a long operation, requiring, for sole leather, from four to eight months, and the lighter harness and upper leathers less in proportion. It is now claimed that this long tanning process can be shortened by electricity, and an English patent has been issued with this object. It is well known that hides being "sweated" for unhairing give off a great deal of ammonia, from the combination of the nitrogen of the gelatinous tissue with hydrogen. This process of decomposition is immediately checked when the hides go into the tan liquors, but the precise chemical reactions which take place in the vats have never been clearly understood. In heavy sole leather it is claimed that, in many cases, tannin is deposited by precipitation in the hide cells, besides that which is directly taken up by combination with the gelatine.

The new process proposes to hasten the tanning by enhancing chemical affinity by means of electrical currents, and thus making these reactions more active. The method is to pass a current of electricity through the vats containing the tannin infusion and the hides. The vat becomes simply a large voltmeter, in which gasses are evolved by the decomposition of water—hydrogen at the cathode and oxygen at the anode. The arrangements are such that the hydrogen alone acts upon the hides, where it rapidly combines with the nitrogen of the tissues, and produces decomposition of the gelatinous matters. After a short period, according to the usual manner of changing tan liquors, the solution of tannin is replaced by a more concentrated one, and the current is reversed in direction, so that oxygen is evolved among the hides, where it oxidizes the tannin, and precipitates it in the pores and intercellular spaces in the tissues.—*Scientific American.*

Oiling the Waves.

Wm. J. Card, captain of the coasting schooner Turban, reports some interesting particulars of his use of oil to break the force of waves, on a voyage from North Carolina to Nova Scotia, in September last. The schooner was of 163 tons registered, with a cargo of 300 tons railroad iron, which loaded her down until her gunwales were not more than two feet above water. On the third day out the weather became boisterous, and on the following morning, soon after daybreak, the vessel ran into a gale. The wind was varying about from southeast to northeast, and blew up a heavy sea, the fury of which was increased by a cross sea, caused by the hurricane that had prevailed for some days to the southward of the vessel's position. The schooner, by reason of her deep loading, was completely at the mercy of the seas, which broke over her with terrific force.

Soon after noon Captain Card stationed a man in the bow of the schooner—it being unsafe to venture on the job boom, which was in danger of being carried away by the seas—and directed him to throw over from a small oil can a little oil at the approach of every "comber." The oil was poured out through the spout of the can, and the captain estimates the quantity thrown over each time at rather less than an ordinary tumblerful. As the supply on board was limited, it was thrown out only at the approach of very heavy seas.

At first petroleum burning oil was used, and while this had some effect, it was not heavy enough to thoroughly break the wave, and kerosene oil—some ten gallons of which had been laid in for painting purposes—was then employed. The result was in every way satisfactory, and the use of the oil was continued for about fifteen hours, by which time the supply was exhausted. The fury of the gale had, however, subsided, and the schooner reached port in safety. Captain Card says that without the use of the oil the vessel could not have lived out the gale—the effect of the oil having been to level the comb of the wave and prevent its break in over the vessel.

TWENTY-FOUR O'CLOCK.—Referring to the plan of numbering the hours of the day from one to twenty-four, already partially adopted in some quarters, *Mechanics* says: An examination of some French publications of the fifteenth century discloses the fact that the manner of duplicating and marking the time from 1 to 24, representing the 24 hours of the day, was practiced as long ago as the date mentioned. A notable instance may be found in a work of that period containing a plate of a watch with the hours from 1 to 12 in Roman characters upon the outer rim of the dial, while upon the inner circle the hours from 13 to 24 are arranged in Arabic figures. The dial in question belonged to a watch in the famous collection of Prince Pierre Soltykoff. It was of gold and enamel, and of very elaborate work-

manship. The age of the watch has not been absolutely ascertained, but from certain characteristics of movement it probably dates from about 1547.

THE CREEP OF BELTS.—Why belts creep is owing to the position of the neutral line of bending; the belt is the tightest on one of its sides; there is a difference in the tension of the two stretches that reach from one pulley to the other, and the difference is what is carrying the load thrown upon the belt. This extra tension increases the strain on the outer part of the belt as it passes over the pulleys, and brings the neutral line of bending nearer the face of the pulley, and consequently diminishing the effective diameter of this one, increasing in like manner the other, and giving a result that does not correspond to the figures that have been computed from the dimensions of the pulley and the speed of the shaft.—*Cotton, Wool and Iron.*

A NEW ENAMELLING PROCESS.—A patent has been taken out in Germany for a new process of enamelling ceramic articles. The glass, terra-cotta, stoneware, porcelain or similar article, is covered with a film capable of conducting electricity, by painting the article with a solution of chloride of platinum or nitrate of silver and burning this in, and then decorating as desired with enamel. This is burned in, and the article is afterwards covered electrolytically with the metal. The galvanic coating does not adhere to the enamel, and very varied effects can be produced by gilding, silvering, coloring, polishing, platinizing, etc., the metallic surfaces of the articles.

ORNAMENTAL SHELF PAPER.—In almost any stationery or grocery store in the country "shelf paper" can be obtained. It has scalloped edges and is perforated in prettily arranged designs, making a lace-like appearance. It has grown from a small beginning ten years ago to a large and important industry, requiring expensive machinery and tools to make it. It is estimated that over \$250,000 worth was made and used last year. The paper is run through a press which prints the design, then dies are used to cut the same. The dies are costly.

SAW MILLS.—There are at the present time over 1,500 saw mills in the United States making lumber, but the statement is made by a journal devoted to the lumber interest that there are not now in all of them 100 first-class filers and sawyers, while there are over a thousand millmen who are willing to pay first-class men all they ask for wages.

METAL STRINGS FOR INSTRUMENTS.—Recent experiments with stringed instruments have shown that a much more sonorous tone can be obtained with metal strings than with those now in use, although the labor of playing on them is correspondingly increased. Steel wires plated with silver or copper gave the best results.

It is a curious fact that wasps' nests sometimes take fire, as is supposed, by the chemical action of the wax upon the material of which the nest is composed. Many the fires of unknown origin in hay stacks and farm buildings may thus be accounted for.

GOOD HEALTH.

Deterioration of Sight.

The causes to which this deterioration of eyesight has been attributed, are alleged to be cross lights from opposite windows, light shining directly on the face, insufficient light, small types, and to the position of the desk, forcing the scholar to bend over and bring the eyes too close to the book or writing-paper, etc.

But were all these defects remedied, the integrity of the eye would not be restored nor its deterioration prevented, for there is another great cause of this trouble—the colors of our paper and ink. White paper and black ink are ruining the eyesight of all reading nations. The "rays of the sun," says Lord Bacon, "are reflected by a white body, and are absorbed by a black one." No one dissents from this opinion; but, despite these indications of nature and of philosophy, we print our books and write our letters in direct opposition to the suggestions of optical science.

When we read a book printed in the existing mode we do not see the letters, which, being black, are non-reflective. The shapes reach the retina, but they are not received by a spontaneous, direct action of that organ. The white surface of the paper is reflected, but the letters are detected only by a discriminative effort of the optic nerves. This effort annoys the nerves, and, when long continued, exhausts their susceptibility; the human eye cannot long sustain the broad glare of a white surface without injury. The author of "Spanish Vistas," in Harper's Magazine, says of Cartagena, that "blind people seem to be numerous there; a fact which may be owing to the excessive dazzle of the sunlight and the absence of verdure." Mr. Seward, in his tour around the world, observed that "in Egypt ophthalmia is universal," attributing it to the same "excessive dazzle" of the wide areas of white sand; and the British soldiers in the late campaign in that country

exhibited symptoms of the same disease. In the Smithsonian Report for 1877, it is stated in a paper on "color blindness," that "M. Chevreul has produced 14,420 distinguishable tints of the elementary colors, from which the paper manufacturers could select colors more agreeable to the eye than the dazzling white, so weakening and lacerating to the nerves of that delicate organ."—*Popular Science Monthly.*

VENTILATION OF BEDROOMS.—The necessity for ventilating the bedroom may be made very plain by a simple experiment. Weigh yourself before going to bed, and then again in the morning after rising, and you will find that you have lost from one to two or more pounds in weight. This loss is partly in water; but it is also partly in the carbon of our food—the butter, oil and starch which we ate on the preceding day. These substances have been burned up, and their product carbonized—i. e., with some animal matter has escaped into the air of the bedroom. Now, if a single ounce of cotton were to be burned in the bedroom, it would fill the air with smoke so as to make respiration uncomfortable, and if this were repeated every hour during the night, even then it would not pollute the atmosphere more than the breath of a single individual during the same time. If two persons sleep in a room they pollute the air twice as much as when only one sleeps in the same room. About 3,000 gallons of fresh air should be admitted hourly for each person sleeping in a bedroom, in order to maintain a proper degree of purity. It is not enough to keep the windows open during the daytime; they must also be kept open during the night, or other methods equally efficient employed.

EQUANIMITY AND LONG LIFE.—Will a man live longer by keeping his mind in a state of equanimity? One of our physicians says: "He who strives after a long and pleasant term of life must seek to attain continued equanimity, and carefully avoid everything which too violently taxes his feelings. Nothing more quickly consumes the vigor of life than the violence of the emotions of the mind. We know that anxiety and care can destroy the healthiest body; we know that fright and fear, yes, excess of joy, becomes deadly. They who are naturally cool and of a quiet turn of mind, upon whom nothing can make too powerful an impression, who are not wont to be excited either by great sorrow or great joy, have the best chance of living long and happy after their manner. Preserve, therefore, under all circumstances, a composure of mind which no happiness, no misfortune, can too much disturb. Love nothing too violently; hate nothing too passionately; fear nothing too strongly." No doubt this is in the main correct, but a too quiet life is also unfavorable to the best health.

TO CURE A COLD.—"Feed a cold and starve a fever" is an old adage, and one which most people still believe in. Dr. C. E. Page, however, writes in the *Popular Science Monthly* of an opposite method. He speaks of achieving great success by confining himself to two light meals, or even one meal a day, for the prevention and cure of colds, and has tried it himself in some most remarkable ways, such as "rising from bed on a cold, rainy morning, and sitting naked for an hour, writing, and then put on shirt and trousers only, the shirt almost saturated with rain and the trousers quite damp, from hanging by the window—these and similar experiments I have tried repeatedly without catching cold; I become cold and become warm again, that is all." This may be fun for the Doctor, but we hardly think the amusement of a character likely to become popular. What an enthusiast can do to demonstrate a theory had an even more remarkable exemplification in Dr. Tanner's fasting forty days.

ILLUSIONS.—All persons, even those in good health and of sound mind, are subject at times to illusions. The brain is a very delicately adjusted organ; is easily disturbed in its action by strong emotions, by furious passions, by indulgence in day dreaming or much novel reading or any intoxicating subject which too exclusively absorbs attention. But by keeping the head cool, and by avoiding unhealthy degrees of mental excitement, and devoting our time largely to practical subjects, and keeping the companionship of healthy, well-poised persons, and correcting our illusions by our judgment, we may overcome the evil habit and establish mental health, unless, as is often the case, they arise from diseased states of brain over which the person has no control.—*Herald of Health.*

BRAIN TENSION.—According to the *Lancet*: "Brain tension is not a proof of strength, but of weakness. The knit brow, straining eyes, and fixed attention of the scholar are not tokens of power, but of effort. Tension is friction; and, the moment the toil of a growing brain becomes laborious, it should cease. We are, unfortunately, so accustomed to see brain work done with effort that we have come to associate effort with work, and to regard tension as something tolerable, if not natural. As a matter of fact, no man should ever knit his brows as he thinks, or in any way evince effort as he works. The best brain work is done easily, with a calm spirit, an equitable temper, and in a jaunty mood. All else is the toil of a weak or ill-developed brain straining."

Financial Results of Hydraulic Mining.

The now famous North Bloomfield hydraulic mine, in Nevada county, which has been the figure-head in the debris fight, and is noted for its complete outfit, its large dam, its big artificial lake and its great bullion production, has of course closed down in obedience to the mandates of the courts. The mine has a most complete modern outfit, and used about 3,000 miners' inches of water every 24 hours. It was thought there was from \$35,000,000 to \$40,000,000 of gold left in the channel, but the law prevents this being taken out. The biggest bar of gold ever made was shipped by this company, weighing 511½ pounds Troy, valued at \$114,000. Of the work done at this mine last year, it is scarcely worth while to go into detail, but the results are of great interest. The figures appended give in a condensed form the results. Up to the end of 1882 the company had expended \$2,000,000, including purchase of property. The figures of items of mining cost and water cost are specially interesting to miners:

RECEIPTS.	
Mining Profits.	
Bullion product in 1883, including Jan., 1884, \$39 00 coin.....	\$483,187.57
Less mining costs, as per statement herewith.....	100,138.51
	\$383,049.06

Water Sales.	
Net proceeds of water sales.....	4,629.46

Personality.	
Reduction in value of supplies, pipe, etc.....	6,103.25

Milton Stock.	
Dividend \$3 per share, Nos. 23 and 24.....	18,379.50

Cash Assets.	
Decrease in Cash Assets—	

Cash Assets, 1882.....	\$184,740.44
" " 1883.....	73,226.32
	\$111,514.12

Debt, 1882.....	\$6,352.56
" " 1883.....	5,455.84
	897.02

	\$111,514.12
	897.02
	\$112,411.14

Receipts.....	\$403,778.37
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DISBURSEMENTS.	
Bonds.	

200 bonds paid in 1883.....	\$200,000.00
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Interest.	
Interest on bonds, etc., \$35,446.05	

Less interest on loans and rebate on bonds, etc.....	11,697.68
	23,748.37

Stockholders.	
Dividends, \$4 per share.....	180,000.00

Disbursements.....	\$403,778.37
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Balance Sheet, January 31, 1884.	
ASSETS.	

Properties.	
Bloomfield Mine and Tunnel, at cost.....	\$687,584.89

Ditches and reservoirs, at cost.....	713,474.02
Milton stock, at cost.....	301,536.64

Union Gravel M. Co. stock, at cost.....	98,953.83
Yuba Gravel Range, at cost.....	7,438.00
	\$1,808,047.98

Personality.	
Supplies in mine.....	\$7,052.30

Iron pipe in mine.....	13,710.85
quicksilver.....	657.00

Mfg tools and machinery.....	5,280.00
Powder stock, at cost.....	3,700.00
	30,718.68

Cash Assets.	
Bullion on hand and in tunnel	\$1,682.00

Due from Bank of California.....	18,615.97
Due from Union Gravel M. Co.....	615.20

Due from call loan.....	44,000.00
Due from call loan.....	5,000.00
Due from Milton M. G. and W. Co.....	8,034.05
	73,226.32

	\$1,967,933.98
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LIABILITIES.	
Stockholders.	

Assessments collected.....	\$1,590,000.00
Less dividends paid.....	\$21,250.00
	\$1,568,750.00

Debt.	
Mortgage bonds outstanding.....	\$100,000.00

Due depositors.....	6,281.03
Due W. N. Radford, Supt.....	174.75
	106,455.84

Profits.	
Mining at Bloomfield to Feb., 84.....	\$1,388,100.37

Sale of water to Nev. Res. Co.....	20,000.00
Sale of Yuba stock.....	4,630.00

Dividends from Milton stock.....	333,894.20
	\$1,746,624.57

Less interest paid.....	\$617,022.04
Less S. F. Exps.....	35,325.45
	\$652,347.49

	\$1,094,277.14
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WATER RECEIVED.	
24 hours—Inches.	

From main ditch.....	795,557
From Humboldt.....	52,920

From Milton Co.....	14,183
	862,660

WATER USED AND SOLD.	
—Inches.	

Mining at No. 8 Shaft.....	57,337
Mining at No. 10 Shaft.....	740,662
	806,309

Sales.....	20,852
	827,161

Yield of	
Bullion and	Costs.

\$13,147 07 No. 8, 18 6-10 cts.....	\$189,138 51
5,597 46 No. 10, 63 1-10 cts.....	908 00
	\$190,046 51

\$13,745 43 No. 8, 18 6-10 cts.....	\$170,166 51
	\$190,046 51

ITEMS OF MINING COSTS.	
Labor.....	\$87,308.72

Powder.....	8,079.00
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Ruse.....	1,015.79
Caps.....	353.18
Blocks.....	5,323.73
Nails.....	630.71
Lumber.....	1,940.11
Coal.....	1,242.86
Steel.....	862.43
Iron.....	413.41
Wood.....	328.82
Oil.....	183.30
Canals.....	51.47
Expressage on Bullion.....	1,652.55
Electric light.....	291.88
Tools.....	344.98
Taxes.....	3,217.97
Hauling.....	945.25
Grizzly bars.....	2,136.82
Feed.....	40.00
Quicksilver.....	1,713.23
Hardware.....	101.25
Sundries.....	337.63
Foundry work.....	174.86
Iron pipe (wear and tear on).....	2,500.00
Three-quarter general expense account.....	21,716.24
806,399 inches water, at 3.24.....	20,194.24
Total.....	\$269,138.51

ITEMS OF GENERAL EXPENSE.	
Services at Malakoff.....	\$5,475.00
Stationery and papers.....	185.28
Expressage and sundries.....	293.35
Legal expenses.....	46.00
Ranching stock.....	46.30
Telephone assessment.....	409.67
Insurance.....	22.15
San Francisco expenses.....	5,257.70
Miners' Association.....	13,555.00
Traveling expenses.....	402.43
Feed and livery.....	230.94
Yuba River Dam Co.....	1,000.00
Furniture in house.....	750.00
Reward in Cummings' case.....	333.33
	\$30,123.65
Less rents.....	1,170.00
Total.....	\$28,953.65

ITEMS OF COST OF WATER.	
Labor.....	\$12,034.41

Lumber.....	1,815.33
Provisions.....	343.08

Feed and livery.....	708.33
Nails.....	106.75

Oakum.....	31.13
Tools, etc.....	32.60
Taxes.....	3,486.13

Sundries.....	43.25
Hauling.....	253.70

Smelting.....	75.75
Powder, fuse, and caps.....	24.50
One-quarter general expense.....	7,238.41

Cost of \$36,251 in water, or 3.24c per in.....	\$27,162.24
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This is charged as follows:	
Mining account three-quarters.....	\$21,715.24

Ditch maintenance one-quarter.....	7,238.41
	\$28,953.65

SOURCES WHENCE GOLD WAS COLLECTED.	
From No. 10 Sluice.....	\$311,885.68

From No. 10 Cut.....	104,146.19
	\$416,031.87

From No. 8 Sluice in tunnel.....	\$2,574.06
From No. 8 Sluice in mine.....	5,808.01

From No. 8 Cuts.....	2,129.39
	10,571.40

From undercurrents.....	13,194.08
From tail sluice.....	3,708.75

From cuts below tunnel mouth.....	1,792.25
From 7,000 feet of tunnel between sluice and undercurrents.....	21,749.14

From quicksilver, cleaning tanks, etc.....	16,130.42
Total.....	\$483,147.97

Total bullion product to February 1, 1884, \$2,829,800.50.	
February 5, 1884.....	5,808.01

A New Atlas.	
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"Cram's Unrivalled Family Atlas of the World" is the title of a publication we have just received. In addition to the maps of States and countries of the world there are several diagrams giving comparative sizes of countries, their population; area, religion and races, commerce, debt, railroads, telegraphs, etc. There are also elaborate tables of statistics concerning the United States. There are illustrations also, embracing flags of all nations, from all quarters of the globe; principal high buildings; progress of century; prominent species of birds; presidents of the United States; races of men, etc. The maps in this atlas are remarkable for distinctness and clearness, being well printed and colored. In fact, from an artistic point of view, they are exceptionally fine. This atlas has been prepared to meet a demand for a convenient general atlas of the world, at a very low price. It is printed on heavy paper, bound in embossed cloth, with title printed in gold. Size, large quarto, 12x14 inches, and contains 132 pages. It really shows great advance in map publishing, for works of this character are usually much higher in price. It is published by R. A. Tenney, No. 20 Sansome street, San Francisco, and is sold for \$5.	
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The World's Fair.

An Address to the Public.

To the People of California:—The holding of a "World's Fair" at San Francisco in the year 1887 is the fixed resolve of the people of California. As natural, the city of San Francisco takes the lead in arranging the preliminaries, and calls upon her citizens to take the initiative in what must be regarded as a somewhat ambitious undertaking, and not to be entered upon without due consideration, and when inaugurated to be prosecuted with resolute determination. In order that this enterprise may be successfully carried out, it is proper to say that at the public meetings already held, under the authority of his Excellency, George Stoneman, Governor of California, and presided over by him, there has been appointed an Executive Committee of prominent citizens of the State, who are charged with the details necessary to inaugurate the work intrusted to them. In pursuance of this duty the Executive Committee would have our citizens, and all classes of them within the territorial area to be benefited, fully impressed with the advantages that would accrue from holding a national and international fair in San Francisco. Our geographical position in reference to our own country, as well as toward the Oriental nations, renders this place a most appropriate one for an international exhibition. It will bring together strange peoples, introducing the native races of the Russian, Indian and Chinese empires with the various races that populate the Indian and Pacific oceans, introducing them to American and European families. This is suggestive of a more intelligent and generous feeling than now exists between these different nationalities, aids to break down old traditions and destroy new prejudices, and may be the opening up of more intimate relations and a more friendly intercourse than now exist. By the exhibition of agricultural and mechanical productions it will stimulate not only the commerce that exchanges, but will mutually educate the producers. The arts and industries of the New World will profit by observing the results of the older civilization, while the Old World may be profited by the inventions and enterprising achievements of the younger nations. Our empire of the Pacific, embracing all those States and Territories contiguous to our coast, will reap the benefit of the double observation, and in turn we are afforded the opportunity of presenting the last group of civilized States to the observation of both hemispheres. We need not particularize the advantages to all our business men and men of wealth to arise from a successful "World's Fair." All who are intelligent will appreciate the benefits that will accrue to us from the successful prosecution of this undertaking.

The Executive Committee, to which has been intrusted the inauguration and management of this work, have determined, as necessary to demonstrate the earnestness of our own people in the premises and as a guarantee to ultimate success, and as an evidence of our willingness to show our confidence before we ask the aid of the general, State or municipal government, or before an appeal to the generosity of those beyond our own borders, to obtain a subscription of half a million of dollars, upon conditions which will be more fully made known at the time subscriptions are solicited by the Finance Committee, which will be organized and enter upon active duty in the premises on Monday, March 3, 1884.

All of which is respectfully submitted.

WASHINGTON BARTLETT,
Mayor of San Francisco.

WM. T. COLEMAN, GEO. C. PERKINS,
CHARLES CROCKER, C. I. HUTCHINSON,
JAMES A. JOHNSON, E. B. POND,
D. J. STAPLES, L. L. BAKER,
LOUIS SLOSS, CHARLES GOODALL,
CHARLES KOHLER, IRVING M. SCOTT,
C. E. WHITNEY, J. P. JACKSON,
A. S. HALLIDIE, A. N. TOWNE,
M. H. DE YOUNG, FRANK M. PINLEY,
C. GREATHOUSE, P. A. FINIGAN,
E. J. COLEMAN, W. H. MILLS,
W. M. BUNKER, G. K. FITCH,
J. S. TABER, P. B. CORNWALL,
C. F. CROCKER, DRURY MELONE.

T. H. GOODMAN,
GEORGE STONEMAN,
M. D. BORUCK, Governor of California,
Secretary. President.

THE San Bernardino Times says the freight charges on ore from Calico to Pueblo, Col., is \$25 per ton, against \$6.52 to San Francisco, yet the miners get better returns from the former after paying the additional freight. Why this is so should be investigated and a remedy applied that will keep the business of ore reduction within the borders of California.

At the annual meeting of Wells, Fargo & Co., in Denver, the following were elected: President, Lloyd Tevis; Vice President, General Manager John J. Valentine; Secretary, James Heron; Treasurer, Henry Wadsworth; Directors

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

DOYLE.—Amador Ledger, Feb. 9: Daniel H. Sawyer, who purchased this promising claim in Hunt's gulch a few months ago, and immediately thereafter started East for the purpose of organizing a company to develop it, writes to us from Scowhegan, Maine, under date of January 27th, in the following encouraging terms: "I wish to say to you and friends in Jackson that my journey East has been completely successful. I have made arrangements with a wealthy company to take stock in the Doyle claim. I can give you the best assurance that inside of a year we shall have a 40-stamp mill running on that claim. My company will be composed of men of experience—old Colorado and New Mexico miners. I shall soon return to Jackson, and hope to do something to develop the mines in that section."

VOLCANO NEWS.—Amador Dispatch, Feb. 9: This last rain has helped the mining interests considerably, as no gravel mines were worked up to the present owing to want of water, and very few of the quartz mines. Rich rock has been found in the Downs mine in the south shaft. The ledge is five feet wide, and pays ten dollars to the ton. They cleaned up from \$7,000 to \$8,000 from ten stamps. They are now running twenty stamps day and night. Gillick & Phillips are taking out rich rock, and it continues to improve as they go down. The Tunnel Co. is running day and night as long as this water lasts. The St. Julian mine, which commenced a few weeks ago to make itself notorious by producing rock of almost unequal richness, is not only "holding its own" in this respect, but continues to produce more and more of it, and of a richer quality than at first. The last lot of ore brought up was completely studded with large specks and chunks of gold of various sizes. It would require only a few tons of such rock to make all its owners independently rich. They are developing the mine as rapidly as possible, and it is to be hoped that the rich strike will not soon "peter out."

MISCELLANEOUS.—The owners of the St. Julian prepared to the mine in the early part of the week, and in the course of a few hours took out from the floor of the tunnel a quantity of rich quartz, estimated to contain several hundred dollars in free gold. The development of the mine is pretty much at a standstill just now. The ore streak seems to be mainly below the tunnel, and to get in out it will be necessary to sink a winze, and open up another level, involving considerable time and expense. The heavy rains have washed out the small gulches thoroughly, and prospectors are out in force searching the bedrock for gold. Parties have made as high as \$5 in a few hours by simply panning out. A new ore chimney has been encountered in the Downs mine at Volcano, of high grade, and sufficient, it is claimed, to keep the mill running for a couple of years.

Calaveras.

SOUTHERN MINING JOBS.—Angels Echo, Feb. 6: The Reserve mill is kept steadily going and pays well. The Invincible mine is paying well and the vein is 20 ft wide. Taylor & Co. are engaged in erecting two nine foot arastras on their mine near his town. Both mills at Carsons are running steadily which is a pretty good indication that the ore is paying. We understand that preparations are making for the erection of a 20 stamp mill on the Mar- bal mine. The new 10-stamp mill on the Morgan has been running about a week and works well. It crushes an average of 21 tons of ore in 24 hours. F. Johnson & Co. recently sold their quartz mine, situated near the town to a San Francisco party who intends to commence working the mine as soon as convenient. Mr. Chas. Smith, Supt. of the Fair Play mine, has been placed in charge of the new enterprise. The price paid for the mine has not been made public.

El Dorado.

ETNA MINE.—Cor. Mountain-Democrat, Feb. 9: here is some excitement here at present about the Etna mine starting to work again. This mine is six miles west of Fairplay on Grizzly Gulch, in Cosmes township. It was discovered and located by A. C. Hite in 1876, and was formerly known as the Little sulphuret mine. He worked it to a depth of 80 ft., and 60 ft in length. The ledge was from 3 to 10 wide and he took out about \$1,700, by running the ledge matter through sluice-boxes, obtaining the free gold and saving the sulphurets with an old tom ton, and sending them to the works at Drytown, Amador county, which paid him a handsome profit. The mine was worked two years by Hite. It has since been owned and worked by a corporation known as the Etna G. M. Co. This company built a fine 20 stamp mill, erected hoisting works, and took out considerable money, but owing to bad management the company made a failure and suspended work, and by one process of law the property came into the hands of Mr. A. J. Burnett of Oakland, a man of real mining experience, who has associated himself with a corporation to be known as the El Capitan G. M. Co., its directors being Chas. S. Bradford, G. E. Buckman, Carl Strohle and James M. Day, and ere long the old Etna will resume work. D. C. Hite, the original discoverer and locator, has not quit mining nor has he left Etna for good. He wends the extension of the Etna on the north, the ledge that was formerly known as the Moco, but at present the Golden Eagle. This mine has been worked to some extent with satisfactory results, and bids fair to be a good mine. I am credibly informed that Mr. Hite has been offered \$1,200 for a fourth interest.

EUREKA MINE.—Georgetown Gazette, Feb. 8: The Eureka mill has been supplied with Hendy concentrators this week. The Tasker concentrators, manufactured at Philadelphia, after a thorough and expensive trial, with both the defunct Tasker pulverizer and the new ten-stamp mill, proved a failure: the mill, concentrators, pans, etc., are all manufactured in California, and Supt. Powning is now happy, and will work the ore for all there is in it. Just before the late storm the water fell a little short owing to freezing weather in the mountains above, then a cleanup was made from about 180 tons of

ore. The result was even more than expected. Had the Hendy concentrators been in place, and the sulphurets properly cleaned and saved for the pans, the result would have been even better. This result, in the words of the Supt., insures the early addition of ten more stamps. All who saw the large amount of amalgam and the large ingot of gold resulting therefrom, are united in proclaiming Eureka a success. For good reasons the Supt. is not permitted to make public the result.

Inyo.

THE MAGNET MINE.—Inyo Independent, Feb. 9: The Magnet mine, situated in the Telescope Range, south of Panamint, and owned by Spear & Thompson, is showing up finely. Considerable work has been done since November last, and the present prospect is that it will turn out to be a productive property.

CHLORIDERS.—The chloriders are all busily at work in Russ and Union districts, and we are informed are taking out rich ore.

DAKWIN.—Flattering reports are received here daily from this mining district, and if what is said is reliable (and we have no reason for doubt), in a short time the old camp will spring into new life and give its inhabitants a taste of the good old times of yore. The rich strike in the Defiance, together, with the pushing of work on other mines there, is attracting attention from all quarters.

ELNA FURNACE.—This furnace is again in full blast. They have on hand a lot of ore from the Farrington mine, Garfield district, Esmeralda county, besides a quantity from their own mine, which will keep the furnace running steadily for some time. The last cleanup showed that the ore worked yielded \$1,600 per ton! How is that for Inyo county?

THE ARGUS RANGE Silver Mining Company, at Reilly, Sherman district, shipped to San Francisco, last Thursday, six bars of bullion, valued at \$7,000. The third shipment within about six weeks, from the Brown Monster mine, Russ district, of 11 tons of ore, rich in silver and gold, will go forward to San Francisco to-day. The Furnace at Swansea has just received a thorough overhauling, and will be put in motion again in a few days. A. W. Eibeschütz will soon put men to work on the Potosi tunnel, Cerro Gordo district, to take out the rich ore struck there for shipment below. Men are at work in all the surrounding districts, and lively times are expected in Inyo county the coming summer.

THE MAXIM M. & Co.—The Maxim Mill and Mining Company, whose pulverizer was wrecked recently during the first 24 hours run, have decided to replace the broken part with new, and give it another and thorough trial. The builder has, it is stated, secured the friction plates, this time obviating any danger of displacement, so that the ordinary wear of the machine is the only question to be decided. The balance of the plant is first-class, the ore easily crushed, the management competent and careful, and the merits of this grinder, if it has any, will now soon be demonstrated. The new portions of this mill are already on the way here by express.

Mono.

BODIE MINE.—Free Press, Feb. 6: There is a visible improvement "all along the line," with good promise of something better to come. While we are not over-sanguine, we believe that this district will make quite as good a showing during the coming season as it ever has. Certainly, the outlook could not be brighter nor the condition of things healthier than at present. What we have in sight we are certain of—the rest we hope for, with solid evidences of realization. Take it all in all, the mining prospects of Bodie are better than good.

STANDARD CON.—During the past week there were extracted and sent to the mills 1,386 tons of ore; 1,315 ounces of crude bullion were received, and \$10,853 shipped to the company. The winze from south drift No. 2, 385 level, is down 83 ft; progress 11 ft. The vein is four and a half ft wide of good ore. The stopes are looking as well as usual, and everything around the mine and mills is running smoothly.

BODIE CON.—Supt. Irwin reports as follows for the past week: The usual quantity of ore was shipped to the mill. The ore was extracted from the 200, 306, 600 and 780 levels. Upraise No. 1, 306 level, has reached the height of 73 ft. The vein at this point has widened to about four ft of very rich ore. The north drift, 550 level, is in 77 ft, with about one foot of good ore in the face. We have been preparing during the week to extract ore from the 306 and 200 levels, and now have ore ready to ship to the mill from these places.

BODIE TUNNEL.—The ore formation in the stopes both north and south on the 300 level is looking well, the ledge averaging about three ft in width.

GOODSHAW.—Owing to the late storm they were unable to start up the works, but as soon as the roads are passable and water can be obtained to fill the tanks, they will start up.

MATTERS AT BENTON.—Cor. Bodie Free Press, Feb. 9: Work still continues at the Wild Rose, but the snow will prevent hauling ore to the Banner mill for some time, though there is enough ore delivered to keep the mill running for six weeks or more. Encouraging reports come in from those prospecting in the White Peak or old Montgomery district, and the chances are that next spring will show up some new developments. The Diana mill has just closed a short and successful run on a lot of ores from various mines in the vicinity of Benton, and demonstrates the possibility of working our low grade ores to good advantage.

Nevada.

MAGENTA MINE.—Grass Valley Union, Feb. 6: Some rich specimen rock has been taken out of shaft No. 5, on the ledge within the past two days, at the depth of thirty feet. This rock, it is estimated, will go fully \$150 per ton, and it will do that and more to judge from some of the specimens taken out. A new eight and a half inch pump has been put in the Magenta shaft down to the 300 level, to replace the six inch pump, and a seven inch from that to the 400 level, and the water is now handled without difficulty. In making the change the water increased somewhat in the shaft, but it is being disposed of rapidly, and the sinking of the shaft and the drifting on the 400 level, which has been interrupted for the past week will be immediately resumed.

MINING IMPROVEMENTS TO BE MADE.—Grass Valley Union, Feb. 6: The Nevada G. and S. M. Co. is negotiating for heavy machinery to work their

mine on Ophir hill. The Company has also bonded the Peabody mine, and the Grass Valley Mining Company's claim on New York Hill, better known as the old Bobby Smith ground. Work is to be commenced on all of these claims immediately. At an early date the Company will also erect a 10-stamp mill, with all the modern improvements, a mill-site having already been secured near Boston Ravine.

LEAVING THE HYDRAULIC MINING SECTION.—San Juan Times, Feb. 9: A number of the residents of Columbia Hill have gone or will soon leave to seek homes elsewhere. Some will go to the southern portion of the State, or to Oregon and Washington, to make future homes for their families. Since the Sawyer decision the people in this part of the county are all at sea, and the disposition to emigrate is strong among them. Unless something turns up to turn the tide of emigration to the Ridge (the country between the South and Middle Yubas) will be nearly depopulated before another year rolls around.

WATER POWER STARTED.—Nevada Transcript, Feb. 12: The Charron Company have turned on the water power at their mine, and the pumps are now run by that cheap and convenient motor, which is also to do the hoisting very soon. The connections were also made with the mill, but some of the gearing broke after a short run, and steam had to be started in that department again while the necessary changes and repairs are being made. In a few days the water will be doing all the work out there that has heretofore been done by steam engines.

DULL TIMES AT SMARTSVILLE.—Grass Valley Union, Feb. 12: Through injunctions and legal obstructions of various kinds, all of the mines at Smartsville are shut down, and in consequence the times are very dull there, and it is feared there is little hopes for improvements. Many of the unmarried men have gone away, and a number of the married have also sought other locations to obtain employment, with a view to removing their families. Among those remaining there is a strong disposition to seek the new mining fields in the Coeur d'Alene region, and with the coming of spring it is the intention of quite a number to emigrate there, in the hope of finding new diggings and a new home. This is one of the effects of shutting down the hydraulic mines, and Smartsville is not the only mining locality that will be to a large extent depopulated from this cause.

LOCAL MINES.—Tidings, Feb. 5: The Idaho Co. have their ditch clear, and work was resumed underground on Monday, after a delay of three or four days. The ledge in the lower level is very large and rich, much more so than usual with the large veins found in this famous mine. On Monday the Idaho Company declared their 171st dividend, this time amounting to \$5 per share on the capital stock. The Empire (the oldest mine in the district) is looking better than ever, and is turning out rich ore,—the ore now coming out showing sulphurets and gold freely. The 20-stamp mill at the Empire is kept running day and night. There has been a great change in the appearance, underground, at the New York Hill mine. For years past the rock has been extremely hard and progress in driving drifts was necessarily slow. Three and one-half ft per week has been about as much as the miners could drive in the drifts. Week before last the distance driven in the 13-level was nine ft and last week it was 12 ft. The ore looks much better than it has for a long time. The Slate Ledge Quartz M. Co. are meeting with success. The company are only prospecting, and there are only two or three owners. Since May last something in the neighborhood of \$7,000 has been taken from this claim and last month a dividend of \$600 was declared. The contractors who have been sinking the shaft 50 ft deeper at the Imperial mine, have completed their work, and another contract has been let for sinking 50 ft further. The ledge is looking well in the bottom, and is gradually improving as depth is attained. The North Banner Con. Tunnel Co. are getting out very good ore, and the mill is running night and day. The company have made arrangements with J. M. Lakeman for putting five additional stamps in the mill. The company have considerable rock on the dump which is being put through the mill as fast as possible.

Plumas.

SPANISH RANCH.—Cor. Plumas National, Feb. 12: "The Thompson & Kellogg bed-rock tunnel is into the Wahponsee mountain over 200 ft, and it has cut heavy springs of water lately. The workmen are daily expected to strike the back channel known to be in the mountain. John O'Brien is still working his old claim on the Wahponsee—very quiet, but he "gets it, all the same." Challen & Co., in the Sharp Ravine diggings, are still pegging away into the mountain, expecting every day to strike it big. Abe Bolyar, on the Queen Sabe, is reported doing well. S. S. Taylor, in the McVey diggings, is putting up one of the new patent hydraulic elevators, and will make his claim "shell out" in good shape this spring.

Shasta.

SOUTH FORK.—Shasta Courier, Feb. 9: The mining items from South Fork are somewhat scarce at present, as only 3 of the 5 arastras are running, though about the usual amount of work is being done on the mines. The erection next Spring of the two Cannon Ball mills, now contemplated, and the rumored starting of the old Peck—now Willard—mill, will add materially to the growth of our camp. O. Engle and H. Dunham have commenced piping in Kanaka, opposite Muletown, and are sanguine of success. Two giants are now at work in Hard-scrabble.

NEVADA.

Washoe District

SIERRA NEVADA.—Virginia Enterprise, Feb. 9: Connection between the 2000 and 2700 levels is about made. This connection will give a circulation of air that will permit of active prospecting in the north end of the mine. The northeast drift on the 3100 level is being rapidly advanced. The face is in quartz, with one streak that prospects well in gold.

OPHIR.—The usual progress is being made in the drifts on the 150 level. These drifts are finding some streaks of ore.

UNION CON.—The main north and main south drift on the 3,100 level will connect about next Monday or Tuesday. This connection will give a circulation of air that will cool off all the lower levels and permit of active prospecting in all directions.

ALTA.—There has been some delay in the work of

advancing the east crosscut on the 2150 level, owing to deficient ventilation, but this has been remedied, and the work will now progress regularly and rapidly.

HALE AND NORCROSS.—The sump below the 2800 level has been completed, and a station is being opened at the 2800 level, from which exploring drifts will be run. The rock is of a very favorable appearance.

BEST AND BELCHER.—The material at the bottom of the joint Gould and Curry winze, down from the 2500 level, remains about the same. There is some water, but it does not greatly interfere with sinking.

COMBINATION SHAFT.—The shaft is nearing the 2800 level, at which point a station will be made and a drift started west. The shaft will be put down to the 3000 level as soon as possible.

UTAH.—The northeast drift on the 1750 level is now out about 250 ft. The face is in a favorable vein material carrying quartz that gives promising assays.

BELCHER.—The regular amount of ore is being extracted from the old upper levels, and the mills on the Carson river are again running to their full capacity.

SAVAGE.—Good progress is being made in the exploring drifts to the northward on the 2600 level, and the ground presents a very promising appearance.

IMPERIAL.—The main west drift has now entered the regions of the old upper levels in which it is expected to find a considerable quantity of milling ore.

MEXICAN.—The mine is being thoroughly overhauled and put in good repair from the 2500 down to the 3100 level preparatory to active prospecting.

YELLOW JACKET.—A full force of men is now employed in the mine, as there is a good stage of water in the Carson river, and the mills are all running.

SCORPION.—The face of the main west drift on the 500 level is in vein porphyry, with occasional streaks of quartz and clay.

CROWN POINT.—The mills on the river being now able to run to their full capacity, operations are again active in the mine.

ANDES.—A good deal of quartz of good quality is being found in the drifts, with some ore that will pay for milling.

Columbus District.

THE COLUMBUS CON.—True Fissure, Feb. 6: The main shaft has attained a depth of about 90 ft below the station of the third level, making a total depth of about 340 ft. The ground in the bottom of the shaft is somewhat mineralized, and favorable for good progress in sinking. The drift from the shaft on the third level has reached a length of about 65 ft. Up to a few days past the ground in this drift has been very hard, when it suddenly changed to a very favorable nature for working. There is a small seam of quartz in the face that gives low assays. The drift from the bottom of the Bonanza winze has attained a length of about 115 ft, and it still continues in broken up vein matter. There remains about 42 ft of a drift to run before connecting the bottom of the Bonanza winze with the shaft on the third level. The south crosscut, from the lateral drift on the 150-foot level, has been discontinued, and drifting commenced on the ledge encountered in running the crosscut. It is expected that the fourth level station will be cut out during the coming week, and after it is completed the work of drifting towards the ledge will be commenced immediately.

Como District.

AN ISOLATED COMMUNITY.—Virginia Enterprise, Feb. 9: The people of Como are now as a community about as solitary as though they were planted on Pitcairn's Island or a patch of ground far out in the midst of the ocean. The mountains rise up about them as white and glittering as so many icebergs. If they are having a good time they are having it all to themselves. They all deserve to become millionaires, for many years have they toiled up there in the lone mountain.

Eureka District.

LOCAL NOTES.—Sentinel, Feb. 10: The Home Ticket grade is again full of snow. Prospects in the Connolly mine are improving daily. The indications for ore in the Mildred mine at Secret Canyon are very good. Report has it that the lessees of the Wittenberg & Hamilton mines have struck it rich. The Silver Connor mine is still producing good ore, but the heavy snow storms prevent shipments. The Jones brothers are shipping some very fine ore to the Richmond furnaces from the Queen mine at Silverado. The Silver Nugget mine at Silverado will be leased as soon as the drifting snow will permit miners to examine the ground. Charley Bro's teams have been busily engaged during the last week hauling ore to the furnaces from the Silver Lick mine on Adams Hill. Some good ore is being extracted from the El Dorado No. 2 mine, on Prospect Mountain, which, as soon as the weather permits, will be shipped to the furnaces. Charley Graham and H. B. McKee, who have been working the old Page & Corwin mine under lease, are now in splendid looking ground for ore. They have been running a drift from the old works, and are in an iron formation with a talc foot-wall, which, in that section, means "ore near by."

Pioche District.

TAILINGS.—Pioche Record, Feb. 2: It seems that the three parties concentrating the Raymond & Ely tailings at Bullionville are doing very well. They have about fourteen tons of very fair concentrations ready for shipment to Salt Lake, that will net them some \$600 clear of expenses. This is the result of two months labor. In case the Bullionville Smelting Company should ever want to start up their furnace again, they will have to put in a new crucible, as the old one is completely demolished, parties having torn it up in their search for bullion.

Schroder District.

THE NEW CAMP.—Cor. Eureka Sentinel, Feb. 10: This new district is 10 miles north of Carlin. A good many people have visited this camp, and have staked off claims in the snow. They could not prospect much as there is very little bare ground to be seen. There are only three mines that are trying to work any this winter. The Grace Darling has four men on; the Yankee Doodle, 4; and the Comstock, 6. They are all taking out ore. Not enough work has been done on any of them to give much of an idea as to what they may amount to, or the extent of the ore deposits. The appearance of the Grace Darling and Yankee Doodle mines is not that of a

defined ledge. They each seem to have a mass of ore from 100 to 150 ft across each way, and they are sinking each one a shaft in the center of the mass. The ore is of various characters. It contains chloride, carbonate and oxide. It assays from \$700 to \$1,000 in silver per ton, with very little gold; and from 10 to 20 per cent of lead, and 1 to 2 per cent of copper. The Grace Darling has a shaft down 15 ft, and has over 500 sacks of ore sewed up ready to ship. In the bottom of their shaft the ore has become more solid than it was on top. The boys call it beeswax ore as it resembles beeswax ore very much, only being much heavier. The Yankee Doodle is down 6 ft. They have the same quality of ore as the Grace Darling. Their shaft is 600 ft northwest of the Grace Darling shaft.

ARIZONA.

NOTES.—Prescott *Courier*, Feb. 4: Mr. W. C. Dawes, who has just returned from the Tipton county, visited mines in Bradshaw, Peck and other districts, and is pleased with the outlook. Smithline and other miners are doing well in Humboldt district. Judge McPhee is developing a promising ledge near Bumble Bee station. E. S. Junior and his brother miners of Bradshaw district, have huge piles of rich ore at their shafts and tunnels. The Black Warrior mine is yielding good ore, which is being milled. Rich rock was recently struck in the Peck. Mr. Dawes heard that the Senator and Groom creek mills were running. The gentlemen who came from New York city with Mr. J. S. Alexander experienced rough weather in our mountains, but expressed themselves pleased with the mines, the country and with Mr. T. J. Eaman's management of their mine and mill. S. C. Miller and others are taking rich ore from a large mine near Kirkland valley. They ship the ore to Benson. The Copper mountain smelter is to start to-day. United Verde is running. Parties of miners from portions of Nevada, Utah, New Mexico and Colorado are arriving here, en route to Quijota. They will go by Phenix and Maricopa, which is the shortest and best route.

STAY AWAY FROM QUIJOTA.—Tombstone *Epitaph*, Feb. 9: There is not a better mining man on the Pacific coast than W. H. Patton, or as he is more familiarly known by the old Comstock miners, Billy Patton. He is now the General Supt. of the properties in the Quijotas recently purchased by the bonanza firm. In the course of an interview with a reporter the Tucson *Citizen* he made the following statement, which it will be seen corresponds in every essential particular with the opinions expressed by Mr. E. Schieffelin, and recently published: What work is now going on in the Quijota mines? We are driving three tunnels, one on the Logan side, and two on the other. The distance is so great that all the miners have to camp right at the tunnels. There are eight men at work on each tunnel. They are being made by contract. That is all we have at present employed. The tunnel will not need to be timbered, as in the Comstock; the rock will hold itself. How many men will you eventually employ? That depends upon the capacity of the mine. We must first get in our tunnels, winzes and upraises. Then if we have the capacity, that is if we find the ore bodies we expect, we shall then be able to employ a large force of labor, but this is yet quite away in the future. We shall first have to find water, and do our preliminary work in the mine before we can employ miners. People are rushing there altogether in too great haste. It is too bad to see good men going there without a cent. They will certainly see hard times. I wish you newspaper men would discourage as much as possible the untimely rush. People think because of the names of the men who have bought the mines that times will necessarily be good. But they are deceived. There will be plenty of time to go there after water shall have been discovered, and the preliminary tunneling done. But I suppose people will go, although there may be a few sensible enough to profit by the newspaper advice, and go slow.

COLORADO.

QUEEN OF THE WEST LODE.—Colorado *Miner*, Feb. 6: We learn from a Decatur party that, in driving the main drift on the Queen of the West lode, in the Horseshoe, quite a large streak of high grade mineral has been encountered. The mine is owned by a Rochester company.

THE SHIVELY.—Very encouraging reports come to us from this property. It is situated on Brown mountain. Messrs. John Frazier and John Johnson, who are leasing on the 75 and 145 levels, are enjoying excellent pay at present. As the work of exploration goes on there is a noticeable improvement in the pay streak. The mineral is a sulphuret and will range from 300 to 700 ounces silver per ton.

AN IMPORTANT STRIKE.—What is destined to be a very rich strike of mineral was made in the Home-stake tunnel, on Red Elephant mountain, a short distance above Lawson, last Tuesday. The ore is scattered throughout the eighteen inches, and ten inches of solid ore. The miners pronounce the ore exactly as that of the White, and will average from 300 to 400 ounces silver per ton. In two days time two tons of ore were extracted and sent to the Stephens' works.

CORRY CITY.—The machinery is all in place, and is now being adjusted by the constructors. There remain 70 ft in depth of still rock in the lower part of the new shaft to be hoisted. As soon as this rock is removed the lower portion of the shaft will be cribbed and a skip track laid therein, in like manner as above crosscut tunnel level, thereby making direct connections from surface to bottom of new shaft. The ore in the mine is improving in quantity and quality as depth is gained. Some of the features of handling are that the skip will work automatically, dumping itself into a shoot, to be immediately constructed, connecting the top of the shaft with the ore house. In this shoot there will be two screens with large receiving pans below, in which will be caught the fine ore as it passes over, the coarser blocks or pieces descending to the ore house for cobbing. This, it is thought, will effect a considerable saving.

EMPIRE.—From present indications there is a genuine boom in store for the mines of this camp. The Bay State mill, situated a short distance north of town, is now running in full blast, under the management of Nieman & Co. It has 16 stamps and will be used for treating the ore from the Crown Prince and Prince Albert lodes. These mines are

being extensively developed, with flattering results. Large quantities of excellent mineral are being taken out. Messrs. Fletcher & Barrett will start up their Knickerbocker mill the coming week. The celebrated Tenth Legion mine will supply the ore. This mine has large ore reserves which are untouched as yet.

THE DIVES AND PELICAN.—During the week our reporter visited this famous property, which more than any other, has given Clear Creek county her reputation as a bullion producer. Probably no mine in the county is so extensively opened up as the Dives and Pelican group, one of the drifts alone being 1,300 ft in length, and several others five and six hundred ft each, all of which were traversed, and showed an excellent state of repair. The main shaft is now down 1,015 ft, but work on it has been temporarily suspended. We cannot assert with any certainty what the mine is at present yielding, but vast bodies of low grade ore are exposed in various places, which Manager Duff informed us could be profitably worked were it not for the excessive freight charges (\$7.50 per ton) necessary to market the same. Fifty-eight men are working the mine. Lessees on the 340 level are sinking a winze on the Unicorn lode and are now down about 25 ft. Silene & Co. are stopping up from the 340 level on the Pelican lode, about 400 ft from the main shaft; and they now have in their stope in place two ft of solid mineral of about the same character as that found in the Unicorn. That this property will one day resume its former proud position cannot much be doubted, but aside from the work done by the lessees, so long as present exorbitant freight and mill charges continue, the work done by the company will be done with a view to make permanent improvements for future operations, when the vast ore reserves in the mine can be taken down and banded profitably.

DUMONT.—Miners' wages have been reduced at the Albro mine here to \$2.50 per day. This reduction creates a great deal of dissatisfaction among the men.

IDAHO.

A BIG SLIDE.—Ketchum *Keystone*, Feb. 9: A tremendous snow-slide occurred on the mountain overhanging the Queen of the Mountains mine on Wednesday last, which descended with a grand sweep over said works. The shaft was filled with snow, and everything on the surface covered up entirely by snow which followed in the "wake." The mountain is a very high and steep one, and had the owners of said mine concluded to work it during the winter their houses and other property, together with their lives would have been destroyed.

NO HURRY.—Coeur d'Alene *Miner*, January 26: Another private letter says that the mines are more extensive than the public are aware of. That those intending to go need not be in any hurry, for it can not possibly all be taken, even in the next year. The snow is now very deep, and the trails and roads next to impassable. Those there now can do little or nothing until the snow is off. Snow fell here last week to the depth of ten feet. Provisions are high and scarce. Another item in the same paper is as follows: Forty-five miles northeast of Pritchard creek a new gulch discovery has been made, in a valley about one and a quarter miles wide and fifteen miles long. It is reported richer than the placers on Pritchard or Eagle creeks. Digging through seven feet of snow, prospectors discovered diggings going \$1.25 to the pan. A rush has already set in.

COEUR D'ALENE LODES.—Cor. Salt Lake *Tribune*, Feb. 8: There has been development enough on the creek as yet to pronounce the camp a big thing, although there are good prospects in placers on the high rock. There are also several lodes that are very promising, the mother lode in particular. I have seen five ounces of gold pounded out of a piece of rock from that ledge. I have been inspecting the same lode; it shows on croppings very rich coarse gold that would weigh \$2 or \$3, but it is too much of a specimen rock or ledge to suit my ideas for a big mine. I have located two lodes in the camp that look very promising. They are in quartzite formation, but there is so much snow on the ground that it is impossible to trace anything. What I have seen of the camp is very encouraging. The bed rock is slate formation most invariably on Pritchard Creek. The gold is very coarse and well washed. The side gulches emptying into the main creek have a different character of gold. It is more rusty or oxydized. The side gulches do not prospect much and not over half a mile from the mouth. My opinion is that there is an old river running parallel with the main creek through the divide. I shall hunt it up as soon as the spring opens. There are some fellows who became discouraged with the camp and left it, cursing the country. Another correspondent of the same paper had an interview with T. S. Merchant, who has just returned from the new mines. There are about 800 men in Trout Creek Station, about 300 on the trail from that place to Eagle City, and probably about 600 in the mines. There are some individual instances of absolute distress. Men coming from a clime far different from this northern country, ill provided with serviceable clothing, and with inadequate means, are suffering; and as there has not yet been found sufficient prospects to justify such a stampede, it is the opinion of Mr. Merchant that it is the duty of humanitarian journals to counsel a halt until the season of the year arrives that they can camp out doors with less danger of life and suffering. Lots at Eagle City are selling at from \$200 to \$500. The men going in from Trout Creek have established stations four or five miles apart, and a constant fire is kept burning, one party leaving kindling for the party behind, and the half-cold fellows are kept alive. Many people going into Eagle City have trained dogs to harness, which are extensively used in pulling their toboggans. They haul about 150 pounds. Mr. Merchant, in his observations, takes in the fact that sheet iron makes the very best toboggan that can be used in the transportation of supplies, etc. over the narrow trail between Trout Creek store and Eagle City. Nails are worth about \$9 per keg at Trout and \$30 at Eagle. Hence a few enterprising persons are making money by the toboggan express. I asked the gentleman if there was not a heap of smoke for the fire that had been kindled. He immediately said there was a great deal of smoke, yet there was no fire kindled, and he deplored the fact of such a rush being created towards the Coeur d'Alene without a more cogent reason.

THE NEW PLACERS.—Coeur d'Alene *Miner*, Feb.

6: A Stage and Freight Company at Spokane Falls, will start a stage and freight line to the mines this week. The fare will be under \$10, and the freight six cents. Stages will make the trip from the Falls to the mines in 24 hours. Several pack trains are running from Spokane Falls to Eagle city, the principal settlement in the mines. Snow is five ft deep in the mines, and will not go off until April or May. People at the mines and at the Falls talk about an immigration in the spring of from 50,000 to 150,000. Several new towns will be laid out in the mines in the spring. Men talk about an abundance of gold in every gulch in the mountains. It is said, Eagle city will have 10,000 people by the first of July. It is intimated that every one need not expect to make a fortune the first season. Provisions are high at the mines, and no one has any business there unless he has a pocket full of money, and a large stock of grub and a place to put it in. It has been snowing at the mines two weeks and all the trails are impassable. "A dozen of Summit valley miners from Montana, have discovered a quartz ledge 30 miles north-east from Eagle city, and traced the croppings three miles. Assays of the ledge show \$482 per ton. This is white crystallized quartz."

Men are busy all around, although not much work is being done on the mines. Men chopping wood earn from \$7 to \$8 a day, and building is quite expensive. Ax handles sell for \$2 apiece; coal oil \$18 a gallon, and Mr. Knapp says he saw two men fighting over the ownership of an old tin oil can, which each wanted to use as a water bucket. Flour sells at \$40 a barrel, and everything in proportion. Lots sell from \$50 to \$600, depending upon location. Mr. Knapp's impression of the camp is a very favorable one, but he thinks that it is too early to go in just yet, as prospecting is almost impossible with five feet of snow now on the ground. He thinks the quartz mines will prove better than the placer claims and that more quartz claims than placers will eventually be located. He thinks the prospects are good for a permanent quartz camp. Most if not all of the placer claims have been taken up in claims of 20 acres each. On the 10th of this month, next Sunday, the miners intend holding a meeting to cut down the size of the claim and to adjust the amount of land that each man will be entitled to hold. The meeting will also decide how many town lots any one man can hold, and will make some condition necessary for a man to maintain title to his land, such as erecting buildings within a certain time, etc. The placer claims will probably be cut down to five or ten acres in extent, and no one man will be allowed to hold 20 acres in his individual name. A new Recorder will also be elected, as great dissatisfaction is being expressed with the present incumbent. Trouble may arise from any attempt to subdivide the claims already staked out, and lively times are anticipated.

MONTANA.

THE ANACONDA *Inter-Mountain*, Feb. 6: For the 20 days ending yesterday the Anaconda company shipped 2620 tons of crude copper ore. This month and monthly hereafter the shipments of the company will aggregate 25,000 tons. The amount of ore now being raised from the mines is 14,000 tons per month. Over 200,000 tons of ore are on the dump. This is all workable ore and will be shipped to the smelter on the completion of the Anaconda branches. The smelter will start up in September. The concentrator will have a capacity of 500 tons per day and additions will be made to the capacity of the works until they will be able to treat 1,000 tons of ore every twenty-four hours additional to that which will be shipped in a crude state. The smelter will consume 50 tons of coal and 30 tons of coke per day. The matte shipments to Europe will exceed 100 tons daily. The shipments to the mine will consist principally of timber, of which 12,000,000 ft a year will be consumed. The daily ore production of the mine will be 1,000 tons and the company will probably give employment to 1,200 men all told. When the Anaconda smelter shall be in full blast, and if the other copper companies of Butte maintain their present output, which they are quite certain to do, the shipments of Butte in 1885 will exceed those of all other towns on the line of the Northern Pacific from St. Paul to Portland.

ANACONDA.—*Inter-Mountain*, Feb. 4: In the year 1885 and thereafter indefinitely, the Anaconda Company will ship from its smelter in the Deer Lodge valley over 100 tons of matter daily, and when it shall be completed according to the present specifications, its outgoing tonnage will be still further increased. The company's operations will be conducted on a scale never before equalled on the Pacific coast. The mine will be called upon for a daily contribution of 1,000 tons of ore, every pound of which will be sent to the smelter for treatment. So extensive will be the development of the mine, that 12,000,000 ft of timbers will be annually used to support the roofs and sides of the subterranean caverns, which will be excavated in the extraction of ore. The company will, in 1885, when the smelter is in full blast, handle more ore than all the mills and smelters of Butte treated in 1883. The output of the camp will be almost doubled. Yet it must not be supposed that the other smelting companies of this district will be idle. It is announced that the capacity of the Montana smelter, which is now 100 tons daily, will be doubled in the near future, and that plans and specifications for the work are now being prepared. The capacity of the Colorado smelter is also being enlarged. With only four stacks it was totally inadequate to treat the vast available supply of ore. The Parrot smelter, with a magnificent mine to keep the furnaces going, is twice as big as it was a year ago, and a still further enlargement is in contemplation. The Bell smelter will soon be fired up under happy auspices. The mine shows nine ft of workable ore on the 400-foot level. The future is full of hope for Butte. It is already the greatest camp on earth. It will retain its pre-eminence. When its output shall be swelled by the addition of the Anaconda product, the aggregate yield will surprise the mining world and direct the attention of every man who has a dollar to spare, to the opportunities here afforded for investment. Butte, to-day, is the most independent city in the United States, and is surrounded by a mass of mineral wealth never before equalled in amount, richness, permanence or accessibility.

NEW MEXICO.

STRIKES AND SALES.—Silver City *Enterprise*, Feb.

3: Some high grade ore was recently taken from the Brush Heap mine at Kingston, owned by Elliott and Forbes; sample assays of which Mr. Elliott had made during the week give returns of 1366 oz. silver. This ore is a copper silver glance, and has but recently been uncovered. The property of the Queen City mining company, at Oak Grove, was sold under a writ of venditioni exponas on Monday last, and was bid in by I. N. Cohen, as assignee for C. P. Crawford. The mining claims and machinery brought \$6,200 and the personal property \$2,780.25. Among the machinery is a new water jacket furnace that has never been used, also two reverberatory furnaces. Alfred Jeffery returned last week, from Grafton, in the Black Range, and reports that section of the country as coming to the front in good shape. Messrs. Smith, Sansum, Cox and Jeffery are the owners of the Porter mine, an extension of the Ivanhoe, of Bob Ingersoll fame. They have a shaft 69 ft deep and considerable other development work done on the property. They have an abundance of ore which averages 85 ounces silver and \$69 in gold. A rumor has been going the rounds of the territorial press to the effect that the Bremen mine and mill would close down after the first of February. This is a mistake. The Bremen mine has produced more bullion during the past year for the number of men employed than any other two mines in the territory. The fact that the mill has been closed down for the past two weeks undergoing repairs probably gave rise to the rumors. Everything is now in shape and the mill will start to-morrow or soon thereafter. From Mr. Watson, who has had charge of the concentrating machinery at the Cooney mine in the Mogollons, we learn that a strike of some very high grade ore has been made upon the Cooney property, the extent of which is yet undetermined. Average sample assays give the returns at 1900 ounces per ton, and the streak that when struck was very narrow, had widened out within a few ft to six inches and indications of a still further widening as depth is gained. The ore taken from the other openings is of a uniformly good grade, the mill being kept running constantly up on it. Mr. Watson will arrange while here to concentrate the tailings, for which he has contracted until August next with Mr. Cooney.

LAKE LOCALS.—Lake Valley *Herald*, Feb. 9: The ore shipments from Sierra Grande are expected to exceed the past month for February. Fine ore is being taken from Nos. 10 and 25 in the Grande, as well as from other points. The total expenses of all the mines have been reduced now to \$32,000 a month, of which \$22,000 is on account of Sierra Grande. There will be a still further reduction of \$2,500 when the railroad reaches the mines, and of \$1,500 additional when the tramways are in operation for delivering ore to the train and mill. The drill is now down 112 ft in front of the office. It has passed through 15 ft of ore of a similar grade to that in the big cut. This is the upper ore body. It has not yet passed through the flint cap rock which usually overlies the higher grade ore, but has been for several days in very hard rock, making but slow progress. There is very heavy work just below town along the mountain side, and the grading of the branch road progresses but slowly. The track is laid just about half way, and is proceeding at the rate of a mile in five days. The time has been so far prolonged beyond the public expectation, that every vestige of a boom has died away. The town improves steadily, however, and considerable building is in contemplation. It is expected that the shipments from the Bella will reach as much as last month—\$60,000. The Sierra Bella company is now out of debt, with about \$40,000 in the treasury. It is now employing forty-five men as against thirty last month, and although much of the force is still employed straightening drifts, putting in tramway and getting the mine in readiness for the steam hoist, the output has already been considerable since February 1st. It would be an easy matter to take out at least \$150,000 of the rich ore now in sight by gouging for it, but Dr. Endlich proposes to mine it systematically and economically. The present workings are carefully planned, and the proposed development is fully determined. Drifts will be run like streets of a town, crossing at right angles. Of course, very much the larger portion of the ore will be left in place for the present, until it is definitely determined how far the ore body extends.

OREGON.

LITTLE DORY.—Jacksonville *Times*, Feb. 9: Miners are still idle. Wiley & Co., who are drifting in the Dry Diggings, are doing fairly. Green Bros. are still going down on their ledge near Galice creek and take out considerable fine ore. W. R. Cook is mining below his station on the road near Grant's Pass and has struck good prospects. The mines were completely frozen up for a while this week and it seems as if the clerk of the weather intended to slight the miners again this season. From Capt. Alcorn, who was over from Steamboat this week, we learn that owing to the cold weather not a great deal has been done there as yet. Shearer & Prickett have their hydraulic pipe almost ready for work.

UTAH.

PARK FLOAT.—Park *Mining Record*, Feb. 2: Several of the mining companies of the Park are talking of building a tramway from their mines during the coming summer. A general system of tramways will no doubt be the ultimate result. We are happy to state that the Sampson is opening up well, and next week we will have a full report of this mine and its late developments. Lot 21, a shipment of 14 tons, sampled 160.41 ounces silver, and 43 per cent lead, and netted the company \$2,000. The ore house is full of ore of similar quality. The company have broken the road down Empire gulch, and lots 22, 23, 24 and 25 will follow rapidly.

ORE SHIPMENTS.—Received at Mackintosh's Sampling works from the Crescent Mining Co. January 26th, 86,740 pounds; January 27th, 47,270 pounds; January 30th, 59,780 pounds; January 31st, 166,270 pounds; February 1st, 104,740 pounds. Total, 464,010 pounds. The Sampson shipped to Mackintosh's Sampling Works this week 11,120 pounds of ore. The Apex shipped 30,000 pounds of ore during the week to Mackintosh's Sampling Works. The Parley's Park mine shipped 3,000 pounds of ore this week to the Sampler.

Mining Suits.

Alexander - F. Britton, as assignee of the claim of Albert Lasey, has brought suit against Walter C. Childs, to enforce a contract made upon the sale of the Valentine mill and mine in Calaveras county, of date June 9, 1881. The complaint recites that the mine was originally patented to Lasey. Childs bought the property from Lasey, agreeing to pay \$50,000 for it, of which one-fifth cash was paid as agreed. The balance was to have been made good by the payment of three-quarters of the net profits of the mine until the \$40,000 was paid. The mine is alleged in the complaint to have been in condition to work, and it is said also that the profits would have been sufficient to pay the purchase price. Judgment is asked for the \$40,000 and interest since the date of the contract, because Childs has failed and refuses to work the mine.

The case of the United States against McMahon, in the Circuit Court, was dismissed this week owing to the complainant neglecting to produce evidence. The suit was commenced to compel McMahon, who had a homestead on certain lands at the base of Mount Diablo, to relinquish claim thereon, on the grounds that the land is mineral instead of agricultural land, as the defendant, when he applied for the patent, was aware of the mineral nature of the land.

In the case of Carney vs. the Arizona Mining company, a Sierra county appeal, the Supreme Court in bank has affirmed an opinion of one of its departments to the effect that the United States statute of May 10, 1872, requiring a certain amount of work to be performed on mining locations until a patent issues therefor, applies to placer as well as to lode or vein claim.

Meetings and Elections.

FATHER DE SNET M. Co., Feb. 7: Directors—J. B. Haggin, Joseph Clark, Thomas Brown, Thomas Bell and Thomas Menzies. Officers—J. B. Haggin, President; Joseph Clark, Vice President; Henry Deas, Secretary; Laidlaw & Co., Transfer Agents; Bank of California, Treasurer; George E. Webber, Jr., Superintendent. The following statement of the receipts and disbursements for the fiscal year 1883 was presented: Receipts, \$354,554.42; disbursements, \$258,747.13; net profit, \$95,807.29.

STATEMENT.		
January 1, 1883, balance on hand as last report	\$44,131.20	
Net earnings for fiscal year 1883	85,907.29	
December 31, 1883, disbursed six dividends, Nos. 25 to 30 inclusive		
Balance, overdraft	10,001.51	\$120,000
Total	\$120,000.00	\$120,000

REMARKS.
Total number of tons of ore milled during the year, 104,100 tons.
Average value per ton, \$3.40.

STANDARD M. Co., Feb. 7: Directors—John F. Boyd, (President); W. S. Wood and M. R. Cook, (Vice Presidents); L. Osborn, Thomas Brown, Richard H. Lumber and William Willis. At a subsequent meeting of the Directors, Colonel Boyd presented the resignation of William Irwin, who has served the company as Superintendent for seven years, and W. A. Irwin, son of the late Superintendent, was elected to fill the vacancy.

GOLDEN GATE WOOLEN MANUFACTURING CO., Feb. 11th: Trustees Messrs. William Harney, Ariel Lathrop, W. E. Brown, N. P. Smith, Adam Grant and F. P. McLennan. The trustees subsequently elected Wm. Harney, President; N. P. Smith, Vice-President; Ariel Lathrop, Treasurer; H. G. Hall, Secretary.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.
JARED C. HOAG—California.
B. W. CROWELL—Nevada.
L. M. LEHR—San Bernardino and San Diego counties.
J. J. BARNES—Sacramento county.
C. E. CURTIS—Kern and Fresno counties.
A. S. DENNIS—San Mateo county.
A. C. KNOX—Tehama, Yuba and Yolo counties.
W. M. R. McQUIDDY—Tulare county.
F. M. THIGHMAN—Fresno county.
E. H. MACK—Santa Clara county.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

Lost Papers.

If any subscriber fails to receive this paper promptly, after making due inquiries at the Postoffice, he is urgently requested to notify this office by letter, that we may send the missing papers, and, if possible, guard against further irregularities.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alaska M. Co.	California.	4.	2.00.	Feb. 6, Mar. 8.	Mar. 28.	A. Judson.	320 Sansome st.
Alpha Hydraulic M. Co.	California.	5.	25.	Jan. 25, Mar. 25.	Apr. 25.	P. M. Scott.	320 Montgomery st.
Alma S. M. Co.	Nevada.	28.	5.	Jan. 25, Mar. 5.	Mar. 21.	W. H. Watson.	302 Montgomery st.
Alpha Con. M. Co.	Nevada.	17.	50.	Jan. 4, Feb. 11.	Feb. 5.	W. Willis.	309 Montgomery st.
Altman M. & M. Co.	California.	1.	2.	Dec. 22, Jan. 29.	Feb. 18.	J. M. Huntington.	309 California st.
Actme M. Co.	California.	7.	8.	Dec. 22, Jan. 29.	Feb. 18.	J. M. Huntington.	309 California st.
Blue Bluff Gravel M. Co.	California.	9.	50.	Jan. 17, Feb. 25.	Feb. 24.	J. F. Stoddell.	419 California st.
Belle Isle M. Co.	California.	4.	10.	Dec. 21, Jan. 30.	Feb. 22.	C. W. Seadon.	309 Montgomery st.
Belle Isle M. Co.	Nevada.	6.	15.	Jan. 3, Feb. 6.	Feb. 27.	J. W. Pew.	310 Pine st.
Benton Con. M. Co.	Nevada.	12.	20.	Feb. 5, Mar. 11.	Mar. 31.	W. H. Watson.	302 Montgomery st.
Best & Belcher M. Co.	Nevada.	28.	50.	Feb. 5, Mar. 11.	Apr. 2.	W. Willis.	309 Montgomery st.
California M. Co.	Nevada.	10.	24.	Jan. 4, Feb. 11.	Mar. 8.	C. P. Gordon.	309 Montgomery st.
Copperopolis M. Co.	Arizona.	1.	5.	Jan. 2, Feb. 6.	Feb. 25.	J. H. Sayre.	330 Pine st.
Caborea M. Co.	Mexico.	8.	10.	Jan. 2, Feb. 5.	Mar. 17.	W. J. Taylor.	220 Sansome st.
Eckelsdor Water Co.	California.	6.	50.	Jan. 29, Mar. 1.	Mar. 21.	H. W. Watson.	215 Sansome st.
Elmendorf Con. M. Co.	California.	14.	1.	Jan. 8, Feb. 27.	Mar. 17.	E. B. Holmes.	209 Sansome st.
Eureka Con. M. Co.	Nevada.	7.	1.00.	Jan. 15, Feb. 18.	Mar. 10.	E. B. Holmes.	309 California st.
Gardner M. Co.	California.	15.	10.	Jan. 15, Feb. 12.	Mar. 3.	P. C. Harve.	309 California st.
Hale & Norcross M. Co.	Nevada.	80.	50.	Jan. 15, Feb. 12.	Mar. 13.	J. F. Lightner.	309 Montgomery st.
Holmes M. Co.	Nevada.	8.	1.00.	Dec. 26, Jan. 29.	Feb. 19.	C. T. Bridge.	224 California st.
Head Center M. Co.	Arizona.	4.	10.	Dec. 29, Mar. 4.	Mar. 26.	J. W. Pew.	310 Pine st.
Jupiter Deep Blue Gravel M. Co.	Cal.	1.	1.00.	Dec. 17, Feb. 16.	Apr. 4.	C. E. Lande.	426 California st.
Julia Con. M. Co.	Nevada.	17.	10.	Jan. 3, Feb. 5.	Feb. 23.	H. A. Charles.	419 California st.
Mayflower Gravel M. Co.	California.	22.	10.	Jan. 5, Feb. 5.	Feb. 27.	J. F. Moritz.	328 Montgomery st.
Mayflower Con. M. Co.	California.	1.	15.	Jan. 21, Feb. 18.	Mar. 13.	J. F. Donovan.	436 Montgomery st.
Manumoth Bar M. Co.	California.	15.	10.	Jan. 14, Feb. 14.	Mar. 10.	J. W. Pew.	310 Pine st.
Mexican M. Co.	Nevada.	25.	50.	Dec. 26, Jan. 38.	Feb. 20.	E. E. Elliott.	309 Montgomery st.
Martin White M. Co.	Nevada.	17.	25.	Dec. 24, Feb. 7.	Mar. 7.	J. J. Seville.	309 Montgomery st.
Marshall M. Co.	California.	1.	10.	Jan. 14, Feb. 23.	Mar. 12.	C. W. Wagoner.	414 California st.
New Con. M. Co.	California.	17.	10.	Jan. 18, Feb. 28.	Mar. 31.	E. B. Holmes.	309 Montgomery st.
Northern Belle M. Co.	Nevada.	2.	8.00.	Jan. 30, Mar. 10.	Apr. 4.	W. H. Watson.	309 Montgomery st.
North Belle Isle M. Co.	Nevada.	7.	10.	Jan. 3, Feb. 8.	Feb. 23.	J. W. Pew.	310 Pine st.
Ophir M. Co.	Nevada.	46.	50.	Feb. 2, Mar. 6.	Mar. 26.	E. B. Holmes.	309 Montgomery st.
Potosi M. Co.	Nevada.	14.	50.	Jan. 18, Feb. 20.	Mar. 17.	E. B. Holmes.	309 Montgomery st.
Pinal Con. M. Co.	Arizona.	5.	10.	Dec. 15, Feb. 15.	Mar. 14.	A. Adler.	309 Montgomery st.
Pittsburg M. Co.	California.	17.	20.	Jan. 5, Feb. 8.	Feb. 23.	R. W. Wagoner.	414 California st.
Rainbow M. Co.	California.	9.	20.	Jan. 3, Feb. 5.	Mar. 6.	J. E. Jordan.	311 Montgomery st.
Savage M. Co.	Nevada.	58.	50.	Feb. 5, Mar. 10.	Mar. 31.	E. B. Holmes.	309 Montgomery st.
Sierra Nevada S. M. Co.	Nevada.	78.	1.00.	Jan. 15, Feb. 20.	Mar. 17.	E. B. Holmes.	309 Montgomery st.
San Miguel & Trinidad M. Co.	Mexico.	1.	50.	Jan. 11, Feb. 19.	Mar. 10.	C. G. Brooks.	210 Front st.
Santa Anita M. Co.	California.	6.	1.	Dec. 22, Jan. 29.	Feb. 18.	J. M. Huntington.	309 California st.
Tohono M. Co.	California.	1.	30.	Dec. 18, Jan. 23.	Feb. 16.	J. F. Fields.	330 Pine st.
Union Gravel M. Co.	California.	18.	50.	Jan. 18, Feb. 26.	Mar. 18.	H. Pichler.	323 Sansome st.
Utah S. M. Co.	Nevada.	47.	1.00.	Jan. 4, Feb. 7.	Feb. 27.	J. M. Huntington.	309 Montgomery st.
Union Con. M. Co.	Nevada.	25.	50.	Jan. 4, Feb. 7.	Feb. 27.	J. M. Huntington.	309 California st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
El Dorado M. Co.	California.	J. H. Sayre.	330 Pine st.	Annual.	Mar. 10.
Mexican M. Co.	California.	W. L. Oliver.	328 Montgomery st.	Annual.	Feb. 19.
Saratoga M. Co.	California.	M. Hubbard.	123 California st.	Annual.	Feb. 18.
Watt Blue Gravel M. Co.	California.	R. Wagoner.	414 California st.	Annual.	Feb. 18.

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M. Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Feb. 15.
Bulwer Con. M. Co.	California.	W. Willis.	309 Montgomery st.	10.	Jan. 23.
Contention Con. M. Co.	Arizona.	D. C. Bates.	309 Montgomery st.	25.	Jan. 12.
El Dorado Gravel M. Co.	California.	T. Wetzel.	522 Montgomery st.	10.	Jan. 12.
El Dorado M. Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Dec. 2.
Jackson M. Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Jan. 4.
Kentuck M. Co.	Nevada.	J. W. Pew.	Pine st.	10.	Feb. 19.
Mt. Diablo M. Co.	Nevada.	R. W. Heath.	Pine st.	25.	Nov. 26.
Sierra Nevada M. Co.	Nevada.	W. Willis.	309 Montgomery st.	25.	Nov. 26.
Silver King M. Co.	Arizona.	J. Nash.	315 California st.	25.	Dec. 15.
Syndicate M. Co.	California.	J. Stadfeldt.	419 California st.	10.	Feb. 5.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 23.	WEEK ENDING Jan. 30.	WEEK ENDING Feb. 6.	WEEK ENDING Feb. 14.
Alpha.	1.00 1.30	1.00 1.00	2.00 1.70	1.90
Alma.	1.50 1.85	1.50 1.75	1.90 1.70	2.85
Andes.	.45 .50	.45 .50	.45 .45	.35
Alion.	.05 .15	.05 .05	.10 .05	.10
Argenta.	.05 .15	.05 .05	.10 .05	.10
Atlas.	.05 .15	.05 .05	.10 .05	.10
Belcher.	.95 1.00	.95 1.00	1.05 .95	.95
Belding.	2.70 .70	2.80 .70	2.75 .70	2.50
Best & Belcher.	.70 .80	.70 .80	.70 .80	.70
Bullion.	.30 .45	.30 .45	.30 .45	.30
Bechtel.	.30 .45	.30 .45	.30 .45	.30
Belle Isle.	.15 .40	.20 .15	.50 .45	.55
Bodie.	7.25 13.50	8.75 10.00	13.75 7.75	11.75
Bouton.	.30 .40	.30 .35	.35 .20	.25
Bullion.	.50 1.55	1.00 .95	1.10 .95	1.10
Caledonia.	.05 .15	.05 .05	.10 .05	.10
California.	.05 .15	.05 .05	.10 .05	.10
Challenge.	.05 .15	.05 .05	.10 .05	.10
Chollar.	1.85 2.50	2.15 2.15	2.15 2.15	2.15
Confidence.	1.00 .10	1.00 .10	1.00 .10	1.00
Con. Imperial.	.05 .15	.05 .05	.10 .05	.10
Con. Virginia.	.30 .35	.25 .30	.25 .30	.30
Crown Point.	.95 1.00	1.00 .90	1.25 .90	1.20
Day.	.90 1.00	.90 1.00	1.00 .90	1.00
Elko Con.	1.90 2.25	2.00 1.85	2.10 1.75	1.70
Eureka Con.	1.10 1.40	.90 .80	.45 .35	.45
Exchequer.	.40 .45	.40 .50	.45 .35	.45
Grand Prize.	.15 .25	.15 .20	.15 .20	.15
Gould & Curry.	1.85 2.01	1.90 2.00	1.90 1.60	1.80
Hale & Norcross.	1.55 2.10	.60 1.90	1.45 1.60	1.50
Holmes.	.30 .40	.30 .35	.30 .35	.30
Independence.	.30 .40	.35 .30	.40 .35	.50
Julia.	.25 .30	.25 .25	.30 .25	.25
Justice.	.25 .30	.25 .25	.30 .25	.25
Jackson.	.05 .15	.05 .05	.10 .05	.10
Kentuck.	.05 .15	.05 .05	.10 .05	.10
Martin White.	.40 .40	.40 .40	.40 .40	.40
Mono.	1.40 3.20	2.00 1.80	2.10 1.45	2.00
Mexican.	1.90 2.05	1.9 2.30	2.50 2.30	2.45
Mt. Diablo.	2.50 2.75	2.75 .20	2.75 .20	2.75
Mt. Potosi.	.30 .40	.30 .35	.30 .35	.30
Noonday.	.40 .50	.35 .45	.10 .30	.05
Northern Belle.	.15 .45	.10 .15	.25 .30	.50
North Noonday.	2.10 3.00	2.20 2.50	2.30 2.20	2.50
Navajo.	.15 .45	.10 .15	.25 .30	.50
Occidental.	.20 .30	.25 .25	.30 .25	.25
Ophir.	2.20 3.50	2.25 2.30	2.35 2.25	1.50
Overman.	.05 .35	.30 .30	.35 .35	.30
Oro.	.05 .35	.30 .30	.35 .35	.30
Potosi.	.65 1.00	.60 .70	.60 .70	.45
Pinal Con.	.50 1.05	.80 .90	.80 .45	.70
Sage.	2.65 2.90	2.65 2.75	2.75 2.40	2.45
Sierra Nevada.	2.65 2.90	2.65 2.75	2.75 2.40	2.45
Silver Hill.	.75 6.00	.60 .60	6.00 .60	6.00
Silver King.	.35 .40	.35 .40	.25 .50	.25
Scorpion.	.35 .40	.35 .40	.25 .50	.25
Tuscarora.	2.15 2.65	2.35 2.30	2.85 2.55	2.55
Union Con.	1.20 1.35	1.30 1.20	1.00 .85	2.10
Utah.	2.25 2.35	2.10 2.45	2.25 2.05	2.50
Yellow Jacket.	2.25 2.35	2.10 2.45	2.25 2.05	2.50

Bullion Shipments.

Argus Range, Feb. 9th, \$7,000; Ontario, Feb. 5th, \$8,143; Stormont, Feb. 5th, \$7,000; Crescent, Feb. 6th, \$7,970; Ontario, Feb. 6th, \$4,126; Crescent, Feb. 8th, \$2,850; Ontario, Feb. 8th, \$3,986; Horn Silver, Feb. 9th, \$18,000; Ontario, Feb. 10th, \$7,936; Paradise valley, Feb. 10th, \$6,571; Ontario, Feb. 12th, \$4,858; Horn Silver, Feb. 12th, \$15,000; From Eureka Mills, Plumas Co., Feb. 8th, \$60,000.

Business Offices and Sunny Rooms to Let.

We have some desirable rooms to let adjoining the offices of this paper, which will be rented on favorable terms. Stair entrance, No. 252 Market St. Elevator, No. 12 Front St. Parties wishing offices, etc., will do well to call and see them. DEWEY & CO.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

ASSESSMENT NOTICE.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador county, near Drytown, California.

NOTICE is hereby given, that at a meeting of the Directors, held on the 30th day of January, 1884, an assessment (No. 44) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 402 Front street, room 8, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 12th day of March, 1884, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 10th day of April, 1884, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

MARK T. ASHBY, Secretary.

OFFICE: No. 402 Front Street, Room 8, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

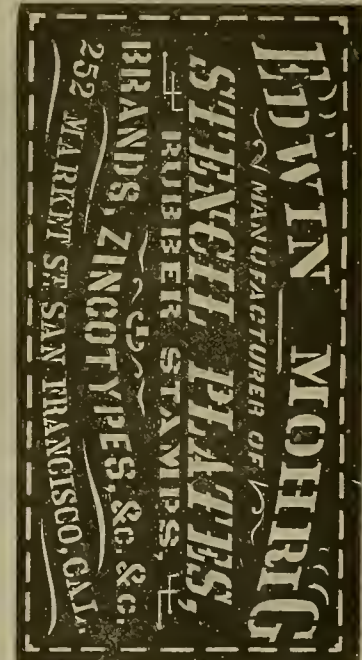
Standard Consolidated Mining Company.

San Francisco, February 2, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 64, of twenty-five cents (25c.) per share, was declared, payable on TUESDAY, February 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.

OFFICE—Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.



Sales at San Francisco Stock Exchange

THURSDAY A. M., Feb. 14.	AFTERNOON SESSION.
720 Alta.	1.80 1.30
30 Alpha.	1.75 500 Argenta.
50 Andes.	40c 100 Alpha.
100 Bonza King.	1.10 100 Bodie.
200 Bulwer.	1.70 100 Bodie.
10 B. & Belcher.	2.40 100 Bonza King.
1400 Belle Isle.	40c 400 Belle Isle.
830 Bodie Con.	7.00 100 Belcher.
200 Benton.	25c 700

Metallurgy and Ores.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.
[ESTABLISHED, 1869.]

A. LUCKHARDT. B. SALAZAR.

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the most suitable Process for Working Ores.
Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,
(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG-
GISTS' GLASSWARE AND SUNDRIES, ETC.

118 and 120 Market Street and 15 and 17
California St., San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scoriaires, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

G. KUSTEL. H. KUSTEL.

★ METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - - SAN FRANCISCO.

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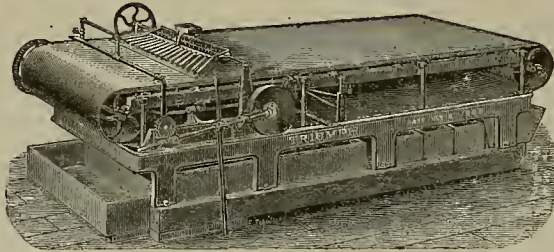
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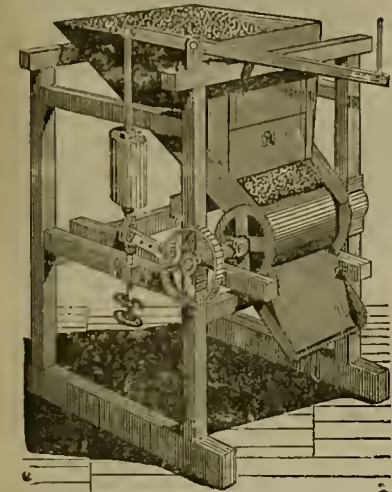
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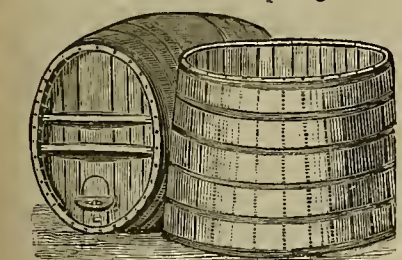
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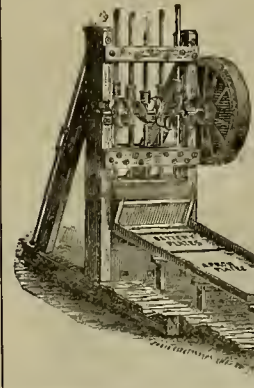
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ORNAMENTATION OF FRAME MOULDINGS.—P. E. Franck, S. F., No. 292,552, dated January 29, 1884. This ornamentation of frame and other mouldings consists of a means for forming and applying the plastic material of which the ornaments are composed, so that it is formed and applied to the moulding in a continuous strip, by means of a cylindrical pattern drum or wheel. In the ordinary ornamentation a plastic material is employed, and this is usually formed in lengths by a straight pattern or mould, into which it is compressed, and afterwards is fixed or cemented on the moulding. This process is slow, and the new invention is intended to displace it, and produce a continuous strip and attach it at one operation.

HINGE.—William Patterson, S. F., No. 292,574, dated January 29, 1884. This is a device for lubricating hinges or butts of that class, having two leaves; the pintle projecting upward from the lower part of one, while the socket is formed on the upper part of the opposite leaf, known as "loose half-buts." It consists of a cup or sleeve surrounding the pintle and extending a short distance upward from the shoulder upon which the socket rests. The socket has its lower end formed with a channel or groove between itself and the plate or leaf, so that it can extend down into the cup, the edges of which thus extend up into the groove. The socket is open at the top to admit oil, and an ornamental screw-cap closes it.

RUNNING GEAR FOR VEHICLES.—Wm. A. Dan-son, No. 292,900. Dated Feb. 5, 1884. This improvement in vehicles consists in a novel construction and attachment of the pole to the forward axle and gearing, so as to relieve the draft animals from the violent shocks and blows of the pole caused by the irregular and unequal stoppage of the front wheels on the rough roads. In the ordinary construction of vehicles the pole is rigidly attached to the axle, and shares with it all shocks, which cause the pole to be moving violently from side to side. This annoys the horses and interferes with their work.

BED-LOUNGE.—August Hansen, S. F., No. 292,556, dated January 29, 1884. This improved bed-lounge has a supplemental set of legs and there are means for operating the same when the back is let down to form a bed, whereby the bed is elevated and caused to stand higher than when used as a sofa or lounge. The patent covers also certain details of construction.

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Horseshoes, keg.....	5 50 @
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Norway, according to thickness.....	6 @ 7
Black—English Cast, lb.....	14 @ 15
Black Diamond, ordinary sizes.....	14 @
Machinery.....	15 @ 16
COPPER—Ingot.....	22 @
Braziers' sizes.....	31 @
Pipe-box sheets.....	31 @
Nails.....	17 @
Bolt.....	31 @
Old.....	8 @
Bar.....	— @
Cement, 100 fine.....	12 @
Lead—Pig.....	4 @ 4
Bar.....	5 @ 6
Pipe.....	5 @
Sheet.....	8 @
Shot, discount 10%, on 500 bags: Drop, 7 bag, 2 1/2 lb.....	2 1/2 @
Chilled, do.....	2 30 @
Chilled, do.....	2 50 @
TIN PLATES—Charcoal.....	6 @ 6 50
Coke.....	5 50 @ 5 75
Bacon Tin.....	21 @
Australian.....	21 50 @
I. C. Charcoal Roofing, 14x20.....	6 50 @ 6 80
ZINC—By the cask.....	19 @
Sheet, 7x3 ft. 7 to 10 lb, less the cask.....	9 @ 10
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Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 1/2 pages, with illustrations, well bound in cloth; 1884. Price, \$1. postpaid. Sold by DEWEY & CO., Publishers, No. 252 Market Street, San Francisco.

N. B.—This is Part I of three volumes on assaying by the same author. To be followed by Part II—Gold and Silver; Part III—Lead, Copper, Tin, Mercury. A majority of the best mining publications yet printed have been issued by and are for sale by DEWEY & CO., publishers of the MINING AND SCIENTIFIC PRESS, S. F.

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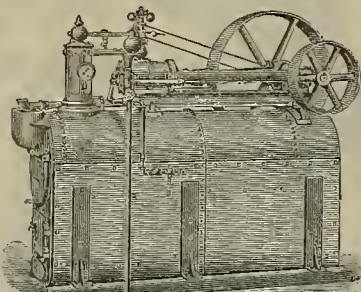
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In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemburg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and thoroughly established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) sooner than other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of most inventions discovered here than any other agents.

Situated so remote from the seat of Government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars of information to inventors, free.

Home Counsel.

Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees intrusted to our agency.

Engravings.

We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

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United States and Foreign Patent Agents, publishers Mining and Scientific Press and Pacific Rural Press, 252 Market Street. Elevator, 12 Front St., S. F.

F. A. HUNTINGTON, SAW, SHINGLE, AND QUARTZ MILL MACHINERY.

We Call Attention to the Following Testimonials as to the Capacity and Durability of the Centrifugal Roller Quartz Mill:

SAN FRANCISCO, Dec. 27, 1883.

Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR—The four-foot Centrifugal Roller Mill, bought of you in August, 1882, for the Whidden Gold Mining Company, of Shingle Springs, has given entire satisfaction, both on our own and on custom work, saving from \$5 to 90 per cent of the gold in the mill. In conclusion I will say that we are so well pleased with it that Mr. Whidden and myself are putting one of the same size on the Tohongo gold mine, near Ravenna, in Los Angeles county.

Yours truly,
P. VEASEY,
34 California St., S. F.

FINE GOLD GULCH, Nov. 10, 1883.

Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR—In reply to your inquiry concerning the working of your Centrifugal Roller Quartz Mill, I am pleased to say that I run one of them for seven months, doing custom work on different varieties of rock, and that the mill gave satisfaction in every respect, and did all that you claim for it.

Yours truly,
BYRON JENNINGS.

GARIBALDI MINE, Dec. 17, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—In reply to your of the 10th inst., I take pleasure in assuring you that your Centrifugal Roller Quartz Mill gives entire satisfaction, and I can heartily recommend it to mining men who want a cheap and efficient crusher.

Yours truly,
E. I. PARSONS, Supt.

32 WASHINGTON AVENUE,
SAN FRANCISCO, Dec. 29, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—Having run one of your Centrifugal Roller Quartz Mills on sample lots of rock from more than twenty different mines, I must say that in every instance it has given the best of satisfaction in every particular; and I recognize its superiority over any other mill manufactured.

Very truly yours,
D. O. MOWRY.

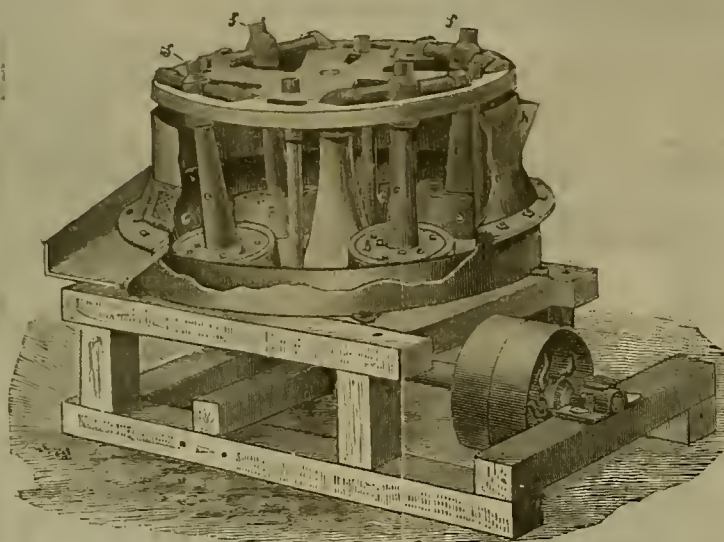
MILLS ERECTED WITH ALL APPLIANCES COMPLETE.

CAPACITY AND DURABILITY GUARANTEED.

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SAMPLE LOTS OF ORE WORKED.

WHERE A MACHINE CAN BE SEEN IN OPERATION.



CENTRIFUGAL ROLLER QUARTZ MILL.

The work done by the Centrifugal Roller Quartz Mill, during the past two years, on various mines and different kinds of rock, PROVES ALL THAT IS CLAIMED FOR IT, VIZ:

1. The cost of same capacity is not more than one-half that of stamps.
2. Freight to mine one-fourth that of stamps.
3. Cost of erection at mine one-tenth that of stamps.
4. It runs with one-third the power per ton of ore crushed.
5. The wear is less than that of stamps.
6. The wearing parts are easily duplicated.
7. It has a much better discharge, and leaves the pulp in better condition for concentrating.
8. It is a better Amalgamator, saving fully nine-tenths of the gold in the mill; the balance can be saved on plates in the usual manner.
9. It is continually crushing; not like the stamp, using power to suspend it in air ninety-nine one-hundredths of the time and the balance making a thundering noise, and accomplishing comparatively small results. It is as far in advance of the stamp mill as the present method of making flour with improved rolls is over the Indian's mode of crushing corn in a stone mortar.

PATTEN'S CONCENTRATOR.

This machine requires less power, less care or attention, and is less liable to get out of repair than any concentrator now in use; all of which any practical miner will comprehend when seeing it in operation.

SONORA, CAL., Dec. 1, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—In reply to yours of recent date, inquiring about the Centrifugal Mill which I bought of you, I will say that I have run the mill four months on hard rock; and I take pleasure in adding that the mill has in every way given the best of satisfaction.

Yours truly,
J. H. NEALE.

GARIBALDI MINE,
Calaveras Co., Cal., Dec. 17, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—In answer to your inquiry concerning the working of the five feet Centrifugal Mill, bought of you for the Garibaldi mine in Calaveras county, I take pleasure in saying it gives entire satisfaction in every respect, and I only regret that the mine does not warrant the purchase of more of them and the continued use of the one now in operation.

Very truly yours,
O. B. SMITH.

F. A. Huntington Esq., San Francisco, Cal.—
DEAR SIR—Your Centrifugal Roller Quartz Mill has run on the Whidden Gold Mining Co. property at Shingle Springs, El Dorado Co., Cal., about four months, and it has done good and satisfactory work, a greater proportion of gold remaining in the mill than in the stamp battery.

FRED JONES, Supt.

HILDRETH RANCH, Fresno Co., Cal.,
January 11, 1884.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—In regard to your mill (Centrifugal Roller), I have crushed about 500 tons of rock in the mill, and am glad to say that it has given entire satisfaction, and can recommend it to the public as the most expeditious and least expensive method for crushing and milling ore that I have ever seen.

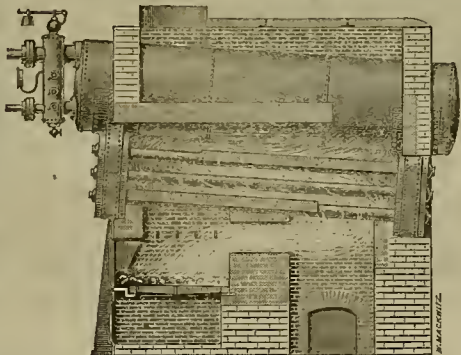
Truly yours,
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ST. LOUIS, Mo., June 21, 1883.

Messrs. Adolphus Meyer & Co., St. Louis, Mo., GENTLEMEN: You ask my opinion as to the practicability of using the "HEINE PATENT BOILER" on a Ferryboat crossing the Mississippi at this point. In reply I beg to say that I have been an engineer along the Mississippi valley for nearly forty years, and now hold a P. S. Inspector's certificate as First Engineer. I have no hesitancy in saying that the "HEINE" boiler is as safe as any type of boiler used on the western rivers. It has no flues with an external pressure that would be liable to collapse, and the drum is a plain cylinder, all well stayed. It is easily cleaned, and can be inspected in any part.

Very truly,
JOHN S. WILSON, Inspector.

It is both serviceable and safe, and I would not hesitate to use it on my River Steamboat.

Very respectfully,
W. W. COREY,
Chief Engineer St. Louis & M. V. T. Co.

OFFICE OF ST. LOUIS & MISS. VALLEY TRANS. CO.,
ST. LOUIS, Mo., July 6, 1883.

Messrs. Adolphus Meyer & Co., GENTLEMEN: I have thoroughly examined the "HEINE SAFETY BOILER," and have been very favorably impressed with it. In my opinion

Referring to the above endorsement by Mr. Corey, we cheerfully endorse him as a competent and careful Engineer, being Chief Engineer of our line.

HENRY C. HAARSTICK, Pres't.

D. J. STAPLES, Pres't.
ALPHEUS BULL, V. Pres't.

INSURE IN THE

(WILLIAM J. DUTTON, Sec'y.
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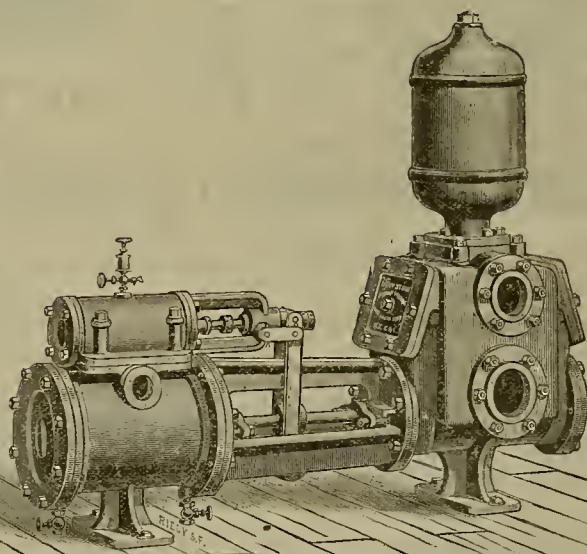
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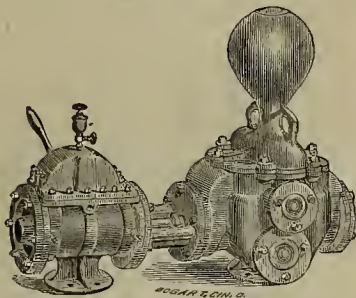
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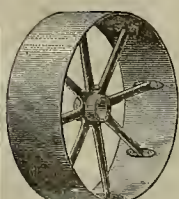
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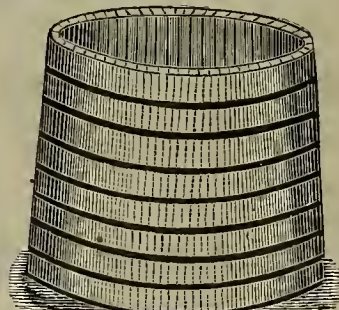
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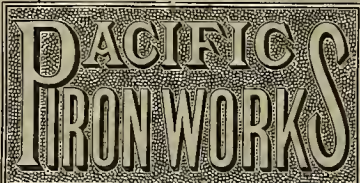
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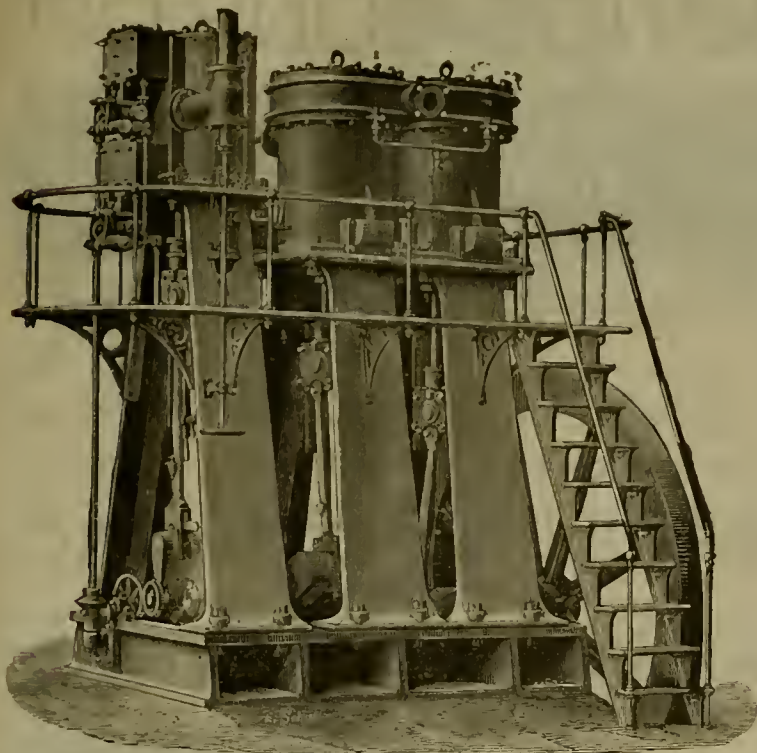
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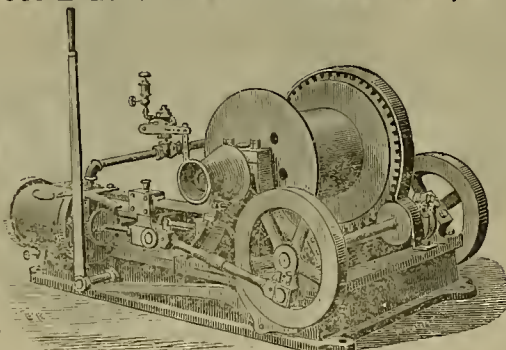


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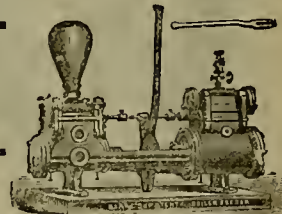
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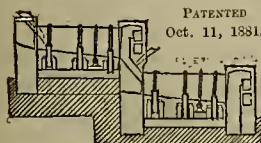
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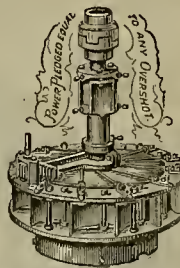
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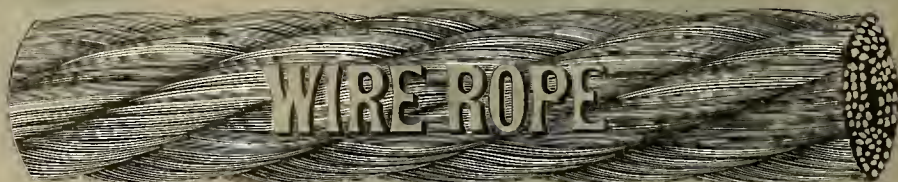
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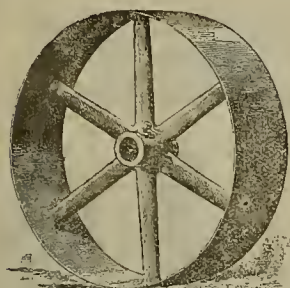
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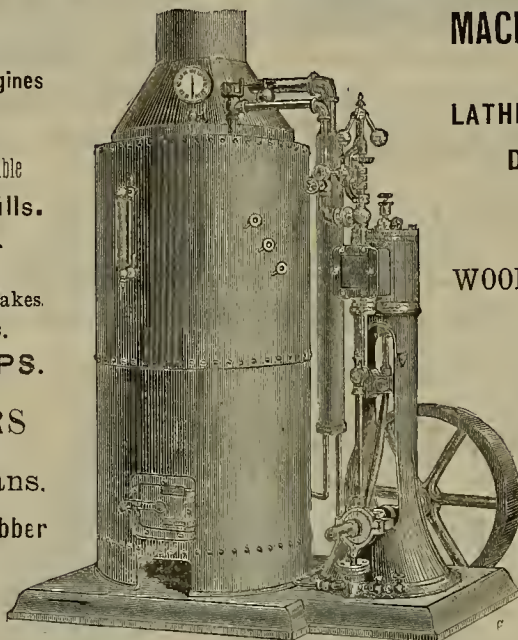
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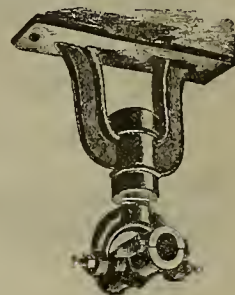
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Stickers,

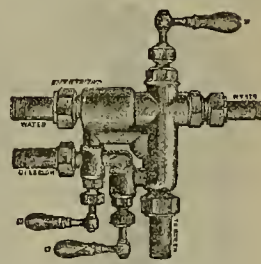
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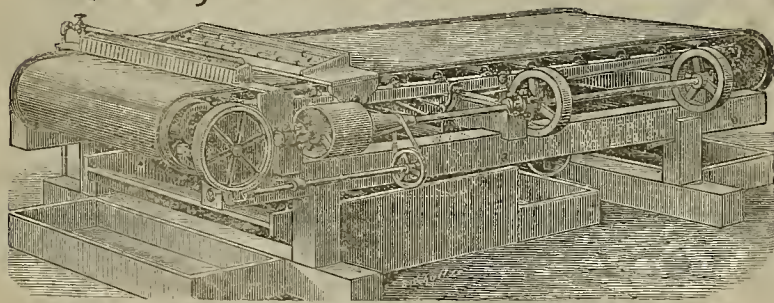
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OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal.
A machine can be seen in working order and ready to make tests at the office of Hinckley, Spiers & Hayes, No. 220 Fremont Street, San Francisco.
To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:
That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.
That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.
That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

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Room 7—No. 109 California Street,
January 3, 1884.

SAN FRANCISCO, CAL.

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The Lemmon Herbarium.

This Herbarium has been removed from the Blake House to a permanent place at 1205 Franklin St., near Fourteenth St., Oakland, one square east of the Post Office, where plants of the Pacific Coast, including Arizona, may be determined on application, and instruction given in botany during the winter. Sets or single specimens of the rare and new ferns of the Pacific Coast for sale.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 23, 1884.

VOLUME XLVIII
Number 8.

Cornish Roll Grinder.

We give herewith two illustrations—front and back views—of a new machine, built by "The Tanite Company," of Stroudsburg, Monroe county, Pa., the object of which is to grind Cornish rolls in place. The machine here represented carries a Tanite emery wheel of 18 inches diameter, and one and a half inches in thickness on a one and a half inch steel arbor. The machine shown weighs 780 pounds. The frame K is designed to be bolted on top of the frame of the Cornish rolls. By means of the wheel and rod G a lateral movement is communicated to the emery wheel, which, in this size of a machine, will travel over a Cornish roll 18 inches long. The wheel F gives a vertical motion of 6½ inches, thus allowing the emery wheel to be worn down to its flanges. The pulley B is 4½ inches in diameter, and the pulley C is 3 inches in diameter.

The success with which Tanite emery wheels have been used in grinding steel, chilled iron, phosphor bronze, etc., would lead one to believe that they could be used successfully on any metal, however peculiar, of which Cornish rolls are made. This belief is substantiated by a letter from F. Koerner, Superintendent of the Canada Consolidated Gold Mining Company, Deloro, Ontario, to the makers of the machine. He says: "The emery grinder for trueing up our Cornish rolls in place, which you built for us some time since, is a fine success. The expense of removing the rolls out of the housing, turning them off in a lathe, and replacing them again, would be double the cost of the machine, not to speak of the loss of business caused by the ten times greater delay of such removal."

If the above strong statements should prove true in general practice, then this machine ought to be promptly and widely introduced in all our mining regions. Messrs. H. P. Gregory & Co., of 2 and 4 California street, San Francisco, and the Hendrie & Bolthoff Manufacturing Co., of Denver, are the Western agents for this machine. In quartz mills where the rolls are used, a machine of this kind would save considerable time and expense.

A Deep Air Gallery.

The opening of the connection between the north and south drifts on the 3100 level of the Union Consolidation mine on the Comstock, completes a fine large air gallery running through the leading north-end mines at the great depth of 3,100 feet. From it supplies of air may be led to all points on the levels above where work is going on. The air current in this deep gallery moves more rapidly than it does in any of the upper galleries. The deeper the point at which such connections are made the more rapid the air circulation. As to the volume of air in this deep gallery the Virginia Enterprise furnishes some interesting facts: The current of air rushes through the gallery at the rate of 650 feet per minute, or seven and a half miles an hour. The volume of fresh surface air thus introduced upon the 3100 level amounts to 20,000 cubic feet per minute. When we consider that 500 cubic feet of air is sufficient for one man for twenty-four hours—that every minute enough air passes into the mine to last forty men twenty-four hours—we begin to see the great value of this natural circulation of air as compared with that which can be forced down into mines by means of blowers. Each candle in a mine consumes about the

same amount of air as is required for a man, but with a supply of 20,000 cubic feet at command at the lowest point in the north-end mines, it will be seen that many men may be worked and much prospecting economically done. Such a great volume of air will soon sweep out all the foul gases and heated air that

Academy of Sciences.

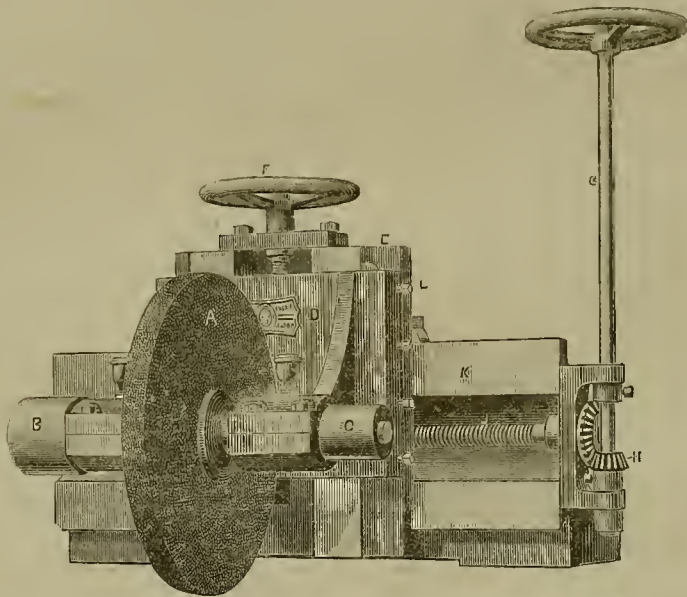
The regular meeting of the Academy was presided over on Monday evening by D. Harkness. Wm. M. Lent was elected a life member, and P. S. Buckminster, G. A. Moore and H. Berkedel resident members. Mr. J. T. Evans

Mining Claims in Canyons.

In the last number of the MINING AND SCIENTIFIC PRESS was given a decision of the Secretary of the Interior to the effect that where part of a legal subdivision is non-mineral land a location that follows the mineral deposit conforms to the public surveys as nearly as practicable. This is an important point, for the reason that the law requires "that placer locations upon the surveyed lands shall conform to the public surveys in all cases, except where this is rendered impossible by the previous appropriation or reservation of a portion of the legal subdivision of ten acres upon which the claim is situated." Because of this provision of the law the Commissioner of the Land Office decided that a miner who laid out a claim in a canyon in this State, following the bed of the stream between the precipitous, non-mineral and uncultivable banks, did not conform to the surveys, and would not get a patent.

The Secretary of the Interior, however, very properly objects to so narrow a construction of the law. While the sections of the law provide for ten-acre subdivisive surveys, they also contemplate cases where it is not practicable to conform the location to such subdivisive lines. They do not limit such cases to those where there has been a prior appropriation of a part of the subdivision, but extend it to every case where it may be impracticable to so locate the claim. The expression "as near as practicable" is therefore to be read "as near as reasonably practicable." In the placer-mining statutes Congress has evidently intended to provide for cases where the situation of the deposits is such that conformity of the location with subdivisive lines is unreasonable. It was the intention of the mining laws generally, to permit persons to take a certain quantity of land fit for mining, and not to compel them to take such a quantity irrespective of its fitness for mining. The act of July 9, 1870, which expressly required placer locations to conform to the lines of the public surveys, was unreasonable, a hardship, and in contravention of the established custom of the mining regions; therefore it was modified by the act of May 10, 1872, so as to provide for the exceptional cases. Such an exceptional case is that where the entire placer deposit in a canyon within certain limits is claimed, and where the adjoining land on either side is totally unfit for mining or agriculture.

THE ATOMIC WEIGHT OF ANTIMONY, by T. Bongaril. The author, at the commencement of his paper, reviews the various methods proposed for the determination of the atomic weight of antimony, their incidental errors and their results. The process adopted by him consists in the oxydation of the sulphide by ammoniacal hydrogen peroxide, as suggested by Claper, and the precipitation in the form of barium sulphate. Metallic antimony was first prepared by electrolysis of a solution of the sulphide in excess of ammonium sulphide, and purified by fusion with sodium carbonate. The regulus was washed with dilute hydrochloric acid, cleansed with sand and dried. The metal was dissolved in potassium sulphide and the solution precipitated with sulphuric acid. The precipitated sulphide was then oxydized by hydrogen peroxide in an apparatus in the form proposed by Claper and the solution precipitated by barium chloride. The results of twelve determinations: Ba=136.8, S=31.98, O=15.96 gave a mean of 120.193.

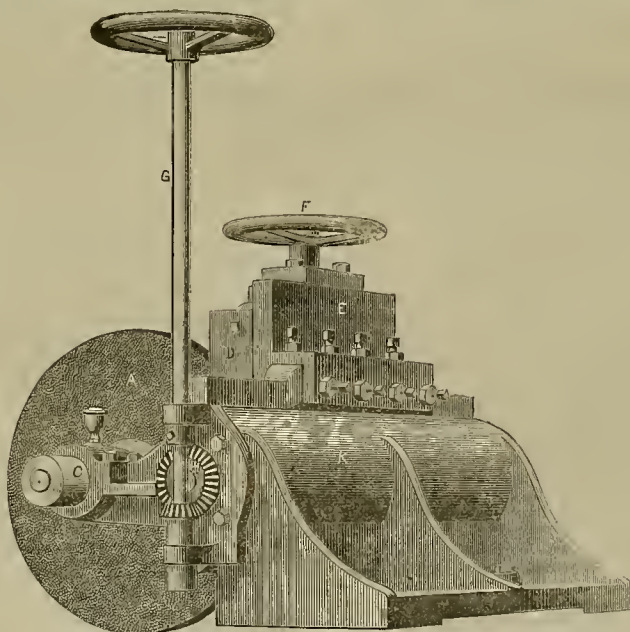


GRINDER FOR CORNISH ROLLS IN QUARTZ MILLS.

has heretofore given trouble in the lower levels. The rapid motion of the air makes it an easy matter to turn it and carry it to points on the

read a description of the new mineral colemanite, which we publish elsewhere.

Rev. E. L. Greene read an obituary of the



REAR OF GRINDER FOR ROLLS OF QUARTZ MILLS.

3,000, 2,500, or any of the levels above, where it may be required.

A LARGE wheel, connected with the hoisting works at the Idaho mine, Nevada county, broke on Friday night, which will put a stop to the use of water in that connection for several weeks. The hoisting works will be run by steam until a new wheel is procured from San Francisco.

late Dr. Englemann, the eminent botanist. This will be published in next week's PRESS.

Mr. Charles Wolcott Brooks read from the last number of *Nature* a description of the phenomena attending the volcanic eruption of Krakatia.

THE gross earnings of the Union Pacific Railroad for the last year were \$29,761,100; expenses, \$16,670,000.

CORRESPONDENCE.

Disturbances of the American Continent.

Recent Volcanic Activity.

EDITORS PRESS:—That the whole American continent (at a period many thousands of years subsequent to man's first appearance on earth) has been again subject to a scene of violent volcanic activity cannot be ignored. This fact is abundantly evidenced by not only legendary lore, but what cannot be disputed material facts as collateral evidence of the pre-existence of a populous race of people considerably advanced in the arts and sciences, of which we have no written history. And unless the legend which I will hereafter relate can be taken as proof of their origin and history, we have nothing left to tell the tale but their ruined towns, fortified cities, mounds, pyramids, works of art and animal remains that are scattered over the whole American continent, silent monuments of their previous existence.

In the Lake Superior copper mines detached masses of metallic copper are found, too marked, and by their side the very tools that the ancient miner used and left in his hasty flight on receiving the dread warning of impending calamity.

In the Western States we find the evidences of their existence in abundance, and in Mexico, New Mexico and Arizona, towns and ruined cities, covering large areas with every evidence of a civilized people, of which the present inhabitants have no record.

In South America there is abundant proof of their former existence. The writer had occasion to cross the Desert of "Atacama," and en route he discovered the ruins of a large town, of which his guide could only tell him that "the oldest inhabitants" were ignorant of its history or the race that inhabited it. It had been a walled city of mammoth proportions; the crumbling walls and ruined houses of sunburned bricks, the labyrinth of streets, broken and unbroken, utensils of glazed pottery of classic forms and design, denoted a high state of civilization. One specimen that the writer selected and preserved as a memento was a water jar that would hold about a quart. It was of Grecian form, the neck long and slender; the mouth-piece for the water discharge was so curiously and ingeniously constructed that the escape of the water would occasion a noise like the chirping of a bird. That its inhabitants perished by a sudden and violent death with but little warning is proved beyond peradventure. An immense field of many acres in extent adjacent to the ruined city was covered with their remains, whitened skeletons of men, women and children lying in groups, pairs and singly—here a male and female lying side by side, there a mother and her child; some of the skeletons were of giant proportions. This was no burial ground was proven by places devoted to that purpose within the city limits. Should it be proven that this terrible holocaust of destruction swept over the whole continent at a time contemporaneous with the scene described it would account for much hitherto unexplained phenomena. There can be but little doubt but that the cause of this wholesale slaughter was owing to poisonous and mephitic vapors and gases that escaped or were evolved from the earth's crust during some violent volcanic disturbance. The inhabitants left the city and sought the plains from fear of falling houses that were thrown down from the effects of an earthquake. A wholesale slaughter ensued, not one being left to tell the tale or bury the dead.

Legendary Lore Relating to Volcanic Disturbances.

In Arizona, on the mesas near the Colorado canyon, there is a tribe of Pueblo Indians known as the "White Indian," many of them having light hair and blue eyes. They are probably of European origin, are house dwellers, live in communities and are governed by a chief elect, whose word is law. They are industrious, peaceable, follow agricultural and pastoral pursuits, and make and wear woolen goods. In the manufacture of the *Poncho* or *Serape*, which is worn by the Indian and Mexican, they excel, and exchange these products for such articles as they require, and do not produce. A horn is blown at 6 A. M. as a signal to commence their daily labors, and again at night to cease. Their houses are raised from the ground, with doors on the roofs and ladders used in place of stairs or steps to enter. They have no written language, but their historical legends are handed down from father to son. The history of their origin is the first thing they learn their children, as soon as they are old enough to understand and commit to memory. They are very jealous of not making known to strangers, or even to other tribes. They guard it as a tribal secret, with penalties for divulging. A well known frontiersman, Capt. John Moss (now deceased) stood in high favor, not only with this tribe, but with all of the Indian tribes of Western North America. He spoke 14 different Indian dialects, understood their signals of war and peace, and was trusted by them as a trustworthy friend. His Indian name was universally known as "Narrowgumpe" (never die). He learned their legendary secret and imparted it to the writer. It was in brief as follows:

Their forefathers, with their wives and fami-

lies, came to Arizona from over the "Big Waters" (the ocean.) They found a fertile country, covered with vegetation; deciduous trees, fruit trees, berries, wild grasses, wild game and birds in abundance. The country was well watered and stocked with a great variety of fish. They soon multiplied and increased; they lived in communities, built towns and houses, cultivated the soil, became numerous and were happy and contented.

A terrible calamity overtook them; the sun took fire and burnt up; the heat was unendurable; trees and vegetation were consumed; the ground rocked too and fro like a troubled sea; the rivers dried up; darkness spread over the land, which continued for many moons. They crawled into caves and dug holes in the ground for shelter, but most of them perished. When a new sun was born it was again light, but their hitherto beautiful country was a barren waste; their towns destroyed, and houses in ruins. The remaining few survivors assembled together and with their wives and children migrated to the low lands bordering the "big rivers" (the Colorado and Gila) and commenced life anew. They increased again and became a numerous and prosperous people; but the condition of the country had changed, there were no longer beautiful running streams of clear water in the interior. Their main supply was from the big rivers, the Colorado and Yuma, from which they brought water for irrigating purposes through canals and aqueducts to their farms.

[An extensive system of canals and aqueducts is still to be seen in Arizona and California, on the Colorado bottom, and in San Bernardino county, but the history of the builders is unknown.]

One day, without warning, a tribe of ferocious Indians from the north swept down upon them, and as they were unaccustomed to war-like pursuits, soon conquered, despoiled and enslaved them. A portion escaped and fled to the mountain ranges, and dug habitations in almost inaccessible places in the stony cliffs that border the "Big River" (Colorado), the walls of which were nearly perpendicular; but they ascended and descended to their cliff dwellings by steps cut in the solid rock, and subsisted on fish from the river. In time they emerged from their hiding places and settled on the mesas or tablelands bordering the river banks (where they now live.) They soon collected a few sheep and goats, and followed agricultural and pastoral pursuits. They are not numerous, but industrious and happy at the present time.

They, like other Indian tribes, believe in a Supreme Being, evil spirits and good spirits. They believe in future rewards and punishments; their heaven is the happy hunting ground, where they reunite with their deceased friends and relatives.

After death, upon reaching the spirit land, they are met by all their deceased relatives who have gone before them, and presented with an ear of corn. Should they eat it when offered they are remanded back to whence they came to pass another term of probation in this world. Should, however, they store it in their pouch, their friends prepare for them a big "eat" (feast) of all the Indian delicacies known, and their troubles are over for all time, while the bad Indian goes to the Indian "Hades," where he can see the good Indian enjoying himself with his friends in which he is not permitted to participate.

X MAX.

White Oaks, New Mexico.

Californians and California Machinery Needed.

EDITORS PRESS:—Mining matters in New Mexico just now attract but little attention, nor do they have quite justice at the hands of a part of the mining press. The advent of the American in force, and the inauguration of American methods and system in prospecting, mining and reduction (except in Grant county), dates from 1879. The production of values by the mines of New Mexico hardly equaled a million in 1880, and did not pass a million and a half in 1881, and these amounts were chiefly from Grant county. Progress has since been really rapid. For instance, prior to the end of 1881 the actual product of Socorro county had been nominal. In 1882 she produced gold \$200, silver, \$140,000, base bullion, 1,039 tons, valued at \$113,812, and shipped 1,000 tons of ore, valued at \$186,800. The shipments from a single smelting plant in the last four months of 1883 exceeded half a million. The production of the county for 1884 will probably reach the total of \$2,500,000, perhaps \$3,000,000. The product of Grant county for 1883 passed \$1,500,000. For the Territory at large a product of, say one and a half millions in 1881, became \$3,667,000 in 1882, and \$6,500,000 in 1883. In all these estimates of course copper and lead are included.

The gold camps of Lincoln county have been especially unfortunate. They are at a distance of 100 miles from the railway; capital has been naturally attracted to regions easier of access. They have had an overproportion of men from Eastern and Southern agricultural States wholly ignorant of mining. What capital has been brought into them has come from and with Eastern men innocent of any mining experience. Such machinery as we have has been "experimental" largely. At this point (the most central in them) are three mills, the first erected in June, 1881, a ten-stamp Hendrie & Botthoff, of good construction. It was erected in the bottom of a gulch upon a foundation of "wash,"

without battery, blocks or piles, and with insufficient power. Short copper plates and raw quick have been the only agencies employed to save gold; none of the owners had any previous experience. It stumbled along, making continuous failures, for a long period. It is now worked as a custom mill by one of the owners, who, by dint of hard knocks, has acquired some knowledge of the work. It now accomplishes as much work as a mill so constructed can, and saves from 50 to 60 per cent of assay.

In the spring of 1882, the Homestake Co. erected a \$45,000 mill to work Homestake ores by the "electric process" of Professor Remsen. That the process and the machinery by which it was applied was entirely "original" was undoubted. The total results were about 3 ozs. of gold, 1,500 lbs. or so of dirty quick and a lot of old iron. In the spring of 1883 the Wilmington, (Delaware) firm of Benson, Thomas & Chandler put in a mill, the pulverizing part of which was two "Tasker" machines; for gypsum and other comparatively soft material they will doubtless serve. They failed, as might be supposed, upon the White Oaks ores, which are uniformly both very hard, and very tough. Two good stamp mills are promised this year; one of them at least will be built by an experienced California firm and the other by a man of wide experience in Colorado. Nothing but proper machinery under skilled direction is needed to make the gold camps of Lincoln county wealthy and prosperous. There are here the finest gold ores, east of the Continental divide, and in rich abundance; they are of unusually good grade. The ores of this district will, under skilled and proper treatment, yield an average clean-up of from \$38 to \$40 per ton.

Fifteen miles south of us, in Nogal canyon, is a fine 15-stamp mill of good construction, and under intelligent management. It is doing well. A concentration mill will be put in on the Bonito canyon, still 8 miles south of Nogal, in the spring. A fine 2-stack smelting plant has just been finished at Organ City, 18 miles northeast of Las Cruces. The Organ mountains can give it an abundance of ore, and its success is probable.

The Torrence mine and mill at Socorro, now for some time idle, have been sold to the Cabinet Mining Co. The new owners will resume the extraction of ore from the Torrence mine, and haul ore from the "Cabinet." A fine 70-ton smelting plant upon the A. T. and S. F. railway at Socorro has lain idle most of the time since its erection in 1881-82. It is understood to have been sold to parties who will make it actively useful. A majority of the works and mills now active are intending to increase their facilities during the year. Enormous amounts of ore and concentrates are passing them by rail, bound for Pueblo, Denver and Argo. The whole mining field is bright, with signs of progress and vigor.

It is unfortunate that we have so few Californians among us. There is no field more favorable for the investment of their capital. New Mexico has passed the era of "prospecting millionaires," and property can now be bought anywhere in the territory for what it is worth in the eyes of a conservative business man; we need their experience and system; we also need their machinery and methods. When one of your great building firms sent an agent here two years ago, the field was not ripe. The connections of nearly all mine owners of that day were Eastern, and they of course went East for their plants. They have learned something, and your men can do business with us now.

Good miners also need have no fear of coming to New Mexico. The climate is superb. The country will suit them, and they are needed. Good miners, in the sense that the term is used by an old mining engineer, are scarce. I doubt if some of our Eastern superintendents have ever seen one. Mere drill pounders are plentiful, of course.

D. J. M. A. JEWETT.

White Oaks, Feb. 9.

ORE PRICES.—The Benson Mining and Smelting Company pay the following rates for ore: Lead ores containing from 35 to 45 per cent lead, 30 cents per unit for the lead and \$1 per ounce for the silver, less \$15 per ton working charges; lead ores containing 45 to 60 per cent lead, same price for lead and silver, less \$10 per ton working charges; lead ores going above 60 per cent lead, same price for lead and silver, less \$5 per ton working charges. Ordinary rates for dry ores.—*Mohave Co. (Arizona) Miner.*

SAVING FINE GOLD.—The *Amador Sentinel* understands that Mr. V. Yelmini, at the Oneida mine, has discovered a process by which the fine float gold may be saved in placer and gravel mines. By his process, it is said that mines which heretofore would only pay about 25 cents to the hand will now pay from \$4 to \$5. He intends to patent his invention, and then we may expect a revival in placer mining in this vicinity. Under this process Mr. Yelmini is successfully operating his mine in Oneida valley.

OLD MEADOW LAKE.—The snow is ten feet deep at Lake Fordyce, which place is about the same altitude as Cisco. At the ruins of the old town of Meadow Lake it is supposed to be from twelve to fourteen feet, although no outsiders have been over there yet to measure it. The few who stop at the old town, with the foxes and the coyotes, have it all to themselves.—*Virginia Enterprise.*

Colorado Mining Outlook.

A correspondent of the *Colorado Miner* says: The mining industry of this great State has made highly encouraging and substantial progress during the past year. The silver lining of the future is tinted with brilliant prospects of solid, enduring wealth. Throughout the whole extent of the mining regions men have been eminently successful in bringing to light new and valuable claims of gold and silver. The fabulous richness of some of the new discoveries is a sure guarantee that the future of our great industry here will be one of unbounded prosperity. An experience of many years in mining, and the examination of mines in Boulder, Gilpin, Clear Creek, Summit and Lake counties, has convinced us that the mineral wealth of the Rockies is practically inexhaustible for ages upon ages to come.

In this county, the old stand-by of the State, satisfactory and highly encouraging results have crowned our every effort with abundant success. Our mines in all portions of the county are yielding large quantities of good pay ore. It seems as though the great treasure box of the world had been hidden away in these grand old mountains for the express purpose of teaching earth-bound mortals not to be astonished at acquiring fabulous wealth by honest industry and toil in a few days. Stand by two old prospectors as we have done, and see them dig out of mother earth the glittering "stuff," worth, laid on the dump, \$50 per pound. Only a pocket, some say. Yes, but the pocket holds out, and the old delvers are now wealthy, and the mine improves in the quantity and quality of ore as the work of development goes systematically on. This is not an isolated case. Many who went to Leadville during the excitement of '79 with empty pockets are now in the enjoyment of nice little fortunes. What this county, as well as many others in the State, needs is proper and systematic development. Yes, we greet the beginning of 1884 with joyous feelings. The gloom and doubt in regard to the character and extent of the mineral resources of this county have passed away, and a universal feeling of confidence is felt by every one that a state of permanent growing prosperity has been reached. This well-conditioned state of affairs has been accomplished by labor, the imperial power of all communities. The toilers in the mines have done noble work. With heavy, sledge-hammer blows they have proved, by actual development, that wealth— inexhaustible wealth—can be mined out of our silver-veined mountains. Contrast the present state of affairs here with the past, when croakers and scientific gentlemen (?) pronounced the mines of Clear Creek county a failure. Verily a bright and glorious future is in store for the mines of the Centennial State.

Mining Ditches and Irrigation.

In the course of an article on the effects of the debris decision, the *Nevada Transcript* says:

The report about the abandonment of the ditches was correct, for it referred only to the systems feeding that part of the county situated above Nevada City, and including the ditches of the Eureka Lake and Yuba Canal, North Bloomfield, Omega and Milton Companies, and having a total length of 500 miles.

As to the South Yuba Canal Company, it has, since Judge Sawyer's decision, practically abandoned the Dutch Flat and Blue Tent ditches, about 35 miles in length, and is now keeping up the remaining hundred miles in order to supply the town water works of this city and Grass Valley, and furnish motive power to such quartz mines in Nevada and Grass Valley townships as are fortunate enough to be within reach of it. Although in operation for thirty years, the sales of the company for irrigating purposes have never exceeded \$1,000 gross per year, and seldom have they reached that figure.

The original construction account of the company amounted to \$1,000,000 for the 135 miles of ditches and the seven artificial lakes it has built on patented ground belonging to itself. It probably has the most extensive and complete water system in America. The record shows that from 60 to 70 per cent of the water it sells has to be stored in its reservoirs for six months before the patrons want it. It has until now given employment to an average force of about 75 men and a living to their families. The current expenses of the property last year were, for instance, \$57,000.

And now we come to an important and unpleasant fact that cannot be ignored and need not be disguised. The revenue derived from the sale of water for power, domestic and irrigating purposes in Nevada and Grass Valley townships, under the most favorable conditions, cannot be made to equal the bare expense of bringing that water by itself to the market, and the company has good reasons to seriously ask, as it is doing, if the abandonment of the whole system is not the only resort left to it.

The Excelsior Company, with its large agricultural possessions, enjoys certain advantages that none of the other ditch owners do, and may manage by great care to weather the storm in case the Sawyer decision stands; but men who have grown gray in the business say there are not very brilliant prospects even for that company.

MECHANICAL PROGRESS.

Improvement in the Bessemer Process.

A patent has recently been issued to Captain William R. Jones, manager of the Edgar Thomson Steelworks, for an improvement in the method of treating the metal in a Bessemer converter when the temperature of the bath becomes too high. The methods hitherto employed for obviating this difficulty have been to add scrap metal until the heat was sufficiently reduced. The improvement suggested by Mr. Jones consists in the introduction of steam into the molten metal in conjunction with the air blast. In the use of this method Mr. Jones found that the length of time during which steam should be admitted to the converter depended upon the size of the pipe delivering the steam, as well as upon other conditions, such as the nature of the metal, the pressure and volume of the air blast, etc. He also discovered that in working a 10 ton converter with steam delivered at about 50 lb. pressure through a pipe 1½ inch in diameter, the steam may be forced with the air about six minutes, or from one-third to one-half the length of the blow. It was found advantageous in some cases to inject the steam with the air blast for a short time just before the completion of the blow, if the heat of the metal was shown by the flame to be excessive, and, in fact, the steam might be introduced at any time when the appearance of smoky vapors or other indications in the flame familiar to the operator show that the metal is becoming too hot. Instead of using the steam at the commencement of the blow, it may be introduced at some later stage, or be used continuously throughout the entire period of conversion in connection with the air blast. The inventor adds that it may be expedient to introduce, instead of steam, a spray of water in a finely divided (atomized) condition, together with the air blast, though, as the chilling effect is much greater than where the steam is employed, the more equitable action of the latter makes its use preferable in practice. Mr. Jones claims as a marked advantage of the present invention that it allows for the use of a grade of pig metal which shall be high enough in silicon to avoid the presence of an objectionable percentage of sulphur, and yet, despite its greater heating capacity, be under the easy control of the operator, who is able to counteract any harmful increase in temperature that may develop during the blow. He makes mention in his specification of the previous use of steam in connection with converter charges, but claims that it was never employed in this peculiar way, or for this same purpose.—*Iron Age*.

Unsolved Problems.

There are two problems, the attempts to solve which have so far baffled the efforts of mechanical skill. These are perpetual motion and navigation of the air. It is only dreamers who now give any thoughts to perpetual motion; not so the navigation of the air. Earnest minds are still engaged in the attempt to prove that the theory can be reduced to practice. Years of patient study and the expenditure of enormous sums of money have failed to convince the present generation that it will witness a triumph in either of the devices named. The public is half disposed to believe that aerial navigation is attainable. That the principle exists is demonstrated by the flight of birds; but the question arises, who is to give it successful application to machinery? A number of persevering toilers on the project have, at different times, summoned spectators to see and be convinced that they had made the grand discovery. Their machines would never, however, ascend. The attraction of gravitation was too much for them, and instead of cleaving the air majestically, they have made an inglorious descent to the earth. There was some hitch detected—some obstacle to be overcome—and thus it has been since inventive genius first asserted its ability to master the interposing complications. But, we are informed, an Englishman named Lenfield has got it at last! He has constructed a flyer, with which he expects to go through the air, in any direction he pleases, at the rate of sixty miles an hour. When he has accomplished this, he will cross the ocean to pay us a visit in his remarkable machine. There is no need of fretting, or any anxiety about his coming. A comet is just now visible in the heavens. After taking its departure, it will not return until the expiration of seventy-one years. Those of our young people who may be fortunate to survive so long are advised not to be astonished, if, when it makes its reappearance, perpetual motion and air navigation still remain things of the imagination only.

Steam Boilers.

A steam boiler, to produce economical results, should be constructed and set so as to permit a free combustion of the fuel and give a sufficient volume of space for the hot gases to combine, in a manner calculated to effect the utmost production of heat due to the fuel consumed. Combustion of fuel is the chemical combination of the substance of the fuel with the oxygen of the air. A mechanical mixture is a composition in which the ingredients retain their natural properties; steam is a mechanical mixture of

heat and water; atmospheric air is an invisible gas, produced by the mechanical mixture of two other gases, viz., oxygen and nitrogen. A chemical combination is an action in which certain elements and substances are absorbed and destroyed in the production of some other element or substance. Heat is a product of the chemical combination of the element oxygen with a combustible substance; and to produce the maximum volume of heat from a given weight of fuel, it is necessary that a proper quantity of oxygen, under correct conditions, be admitted to the furnace and combustion chamber. The maximum rate of heat having been provided for, the surface of the boiler exposed for its operation should be of sufficient extent to allow the necessary time for transmission of heat to the contained water. When the heating surface is insufficient, the heat is certain to be carried through the flues or tubes and into the up-take before it (heat) can be absorbed to an economical extent. There must be, also, ample room for the escape of steam to the surface of the water; and after it has passed above the water it would seem as though it was necessary to bring it (steam) again in contact with some heating surface to thoroughly complete the evaporation and even superheat the steam slightly before it is finally allowed to pass to the engine.—*American Locomotive Engines*.

AMERICAN STAMP MILLS THE BEST.—The *Ironmonger* is slightly disconcerted at the fact that contracts have been made by some of the promoters of Transvaal gold properties with American firms for the machinery to be used in treating their gold ore. It pathetically asks how it is that the necessary machinery cannot be procured in England or Scotland, and recommends to the British engineering firms to lose no time in adapting themselves to the wants of the day. That our mills are vastly superior to anything English mining machinery firms can turn out, is, we believe, beyond all question. We need only point to the success of American stamp mills in Venezuela, Colombia, Honduras, and in other States in Central and South America. English engineers would, however, find that it takes more than mere copying to attain their excellence. Every detail is the result of long experience, and our friends across the Atlantic would rapidly go through the usual fate of imitators, that of failure.—*Engineering and Mining Journal*.

SCRAP FORGINGS.—Scrap forging are not necessarily good or bad; it depends wholly upon the scrap. Blacksmiths are fully aware of this and take pains to select it carefully. What the practice in England may be we know not, but in this country scrap is carefully culled, not by boys, however. Forgings are not made from a pile of old waste-iron, currys, combs, pokers and rubbish generally, but from boiler-plate (cuttings and punching included) which does not vary greatly in quality, and is generally the very best. Horse-shoes are also utilized, and concerning these last there is no question at all as regards quality. Forgings may be made now, as they have been in days past, from the scrap-heap direct, but they are quite apt to be unworkable in machine tools. There is sure to be a hard streak in the journals of a shaft which no tools will touch, and the surfaces where planed are of as many shades as there are kinds of iron.—*Mechanical Engineer*.

A REMARKABLE STEAM ENGINE.—An English firm have recently completed a small, light compound engine, which, in point of weight, eclipses anything heretofore built. This engine is made of steel and phosphor bronze; all parts are built as light as possible, the rods and shafting and all parts possible being bored out to reduce weight. At a speed of only 300 revolutions a minute they indicate over twenty horse-power, and weigh but 105 pounds all told. This engine would give fully thirty horse-power actual at a piston speed of 500 feet a minute. The size is three and three-quarters high pressure, seven and a half low pressure and five stroke. That thirty horse-power can be had from a proper utilization of steam and proper distribution of 105 pounds of metal is certainly most astonishing, especially so considering that the engine is compound.

THE DIAMOND DRILL AS AN EXPLORER.—We have lately, says the *Scientific American*, seen samples of cores cut by the diamond drill that are marvellously curious. Sections of rock and ore drawn up from hundreds of feet below the surface showing the stratification and its inclination, with all the varieties of its composition; the veins of ore and its boundaries and dip are well marked and better measured than if the miner was down in the depths of earth sending up his samples; and what is more valuable, the diamond drill sends up the samples partly polished—so smooth is its cut that you have but to wet the core to bring out all the variegated hues of rock and ore. It matters not as to size—one inch or two feet is within the grasp of the modern explorer.

GAS ENGINES are now made of from ½ to 70 horse-power. Medium sized gas engines, say 16 horse-power, will run on a consumption of fuel of 1.2 pound of coal per horse-power per hour, which is about half the fuel required for the most economical steam engines of the largest size.

SCIENTIFIC PROGRESS.

The Atomic Theory.

The following extract from Wurtze's on "The Atomic Theory" gives a very clear and succinct account of the vortex theory of atoms, which is now being much discussed by scientists:

"In these latest times a theory has arisen which seems to give a mathematical demonstration of the indivisibility, or rather of the peculiar and eternal individuality of atoms. I refer to the vortex atoms of Sir William Thompson.

"Chemists can form an idea of this vortex motion by recalling to mind the rings which rise in still air whenever a bubble of phosphorated hydrogen bursts upon the surface of the water, and the rings which certain smokers are able to make are familiar to all. An apparatus has been constructed by which they may be produced at will. It is a wooden box, one side of which is furnished with a circular opening and the other formed of a tightly-stretched cloth. In the interior of the box fumes of sal ammoniac are produced, which are driven out by a sharp blow on the elastic side. A ring of smoke is then seen to issue from the opening and to move freely through the room. In this ring all is motion; and, independently of the motion of translation, the smoke particles roll over each other and execute a rotary motion in every section of the ring. These motions take place from the interior toward the exterior of the ring, in the direction of the motion of translation, so that the entire mass of air, or smoke which forms the ring, revolves continually round a circular axis, which forms, as it were, the nucleus of the ring. There is this remarkable fact in this rotary motion, that all the particles which are situated upon one of the curves which can be drawn in each section of the ring are indissolubly tied down to their circular paths, and can never quit them; so that the whole mass of the vortex ring will be always formed of the same particles. This theorem was proved by Helmholtz, in 1858. This eminent physicist has analyzed the vortex motions which would exist in a perfect fluid free from all friction. He has proved that in such a medium vortex rings, bounded by a system of vortex lines, are formed of an invariable quantity of the same liquid molecules, so that the rings can move, and even change their form, without the connection of their constituent parts ever being broken. They will continue to revolve, and nothing will be able to separate them, divide them or destroy them. Those existing in the liquid will exist there forever, and new ones can only be excited in it by a creative act.

"The smoke-rings of which we have spoken above would give a perfect representation of these liquid vortex rings if they were formed and moved in a perfect fluid. They are not so; but such as can be formed can serve for the demonstration of some properties of matter in vortex motion. They are endowed with elasticity and can change their form. The circle is their position of equilibrium; and when their form is altered they oscillate round this position and finally re-assume the circular form. But, if we try to cut them, they recede before the knife, or bend round it without allowing themselves to be injured. They gave, therefore, a material representation of something which would be invisible. And when the two rings meet each other they behave like two solid elastic bodies. After the impact, they vibrate energetically. It is a singular fact that when two rings are moving in the same direction, so that their centres are situated upon the same line and their planes perpendicular to this line, the hinder ring contracts continually, whilst its velocity increases; the ring in advance, on the contrary, expands, and its velocity decreases, until the other has passed it, when the same action re-commences, so that the rings alternately pass through each other, but, through all these changes of form and velocity, each preserves its own individuality, and these two circular masses of smoke move through the air as if they were something perfectly distinct and independent. These curious experiments were made in England.

"Helmholtz, therefore, has discovered the fundamental properties of matter in vortex motion, and Sir William Thompson has stated: This perfect medium—these vortex rings, which move through it, represent the universe. A fluid fills all space, and what we call matter are portions of this fluid which are animated with vortex motion. There are innumerable legions of very small fractions or portions; but each of these portions is perfectly limited, distinct from all others, not only in its own substance, but in its mass and its mode of motion—qualities which will preserve forever. These portions are atoms. In the perfect medium which contains them all, none of them can change or disappear, none of them can be formed spontaneously. Everywhere atoms of the same kind are constituted after the same fashion, and are endowed with the same properties. It is well known, in fact, that the atoms of hydrogen vibrate exactly in the same periods, whether we heat them in a Geissler's tube, observe them in the sun or in the most distant nebula."

MEXICAN HIEROGLYPHS.—It has been recently reported that Rev. Father Damazo Soto, of Concordia, Mexico, had discovered a key to the Aztec writings. This announcement ex-

cited considerable diverse comment, as it was known that the ancient Aztec picture writing had long ago been deciphered without much difficulty. The New York *Tribune* hazards the opinion that it is the Toltec writings, and not the Aztec, to which Father Soto thinks he has discovered the key. Of the Toltec writings the *Tribune* says: "We are not aware that any of this priestly text has been deciphered fully, though enough is known of it to warrant the belief that much of the language employed conveyed an esoteric meaning, and was intended to conceal supposed truths from the eyes of the vulgar, much as alchemists used to conceal the real significance of their speculations and formulas in the middle ages. Could this Toltec hieratic writing be deciphered, it is probable that new light would be thrown upon the religion and science of that ancient and interesting people, and such information would be particularly welcome in this era of analytic inquiry."

A SINGULAR OCCURRENCE.—On the 28th of January last, during the great storm, a phenomenon was observed at Hueneme, Ventura county, which possesses some scientific interest in connection with the origin of tornadoes, or, as they are popularly but erroneously called, cyclones. Between 4 and 5 o'clock on the afternoon of the day mentioned a waterspout was observed at sea, traveling in the direction of the town. It left the ocean behind it a scething track of foam, and, "as it came nearer, water was seen whirling in it, and dark objects, either large fish, seals or hordes of seaweed." On striking the shore the waterspout changed into a tornado, tearing up weeds and small trees, and finally struck a house, which it totally demolished, the floor being carried 60 feet and dropped without harm to the occupants. A second house stood in the pathway of the terrible destroyer, but luckily the rotating air column took one of those sudden leaps upward which are mentioned in reports of so many Western tornadoes, and the house escaped uninjured. These particulars are furnished by a correspondent of the San Buenaventura *Free Press*, and show that it was a genuine tornado which did the mischief—such as abound in Kansas, Missouri and other States of the Mississippi valley—but of smaller dimensions and inferior destructiveness. But the interesting circumstance is that this tornado occurred partly on sea and partly on land, and thereby proved the absolute identity, so far as cause is concerned, of waterspouts and tornadoes as completely as Franklin's experiment with the kite proved the identity of electricity and lightning.

INFLUENCE OF HEAT ON THE MOLECULAR STRUCTURE OF ZINC.—In an article published in a foreign exchange, S. Kalscheer says that when rolled zinc is heated to at least 150° C. (302° F.), it loses its clear ring, is easily bent, produces a noise which greatly resembles the "tin cry"—that is to say, it becomes crystalline. If such a plate, that has been heated, be suspended in a solution of copper sulphate, the precipitated copper will show distinctly a crystalline structure. Accompanying this change of molecular structure there is also an increase of density, amounting to .003, that takes place; at the same time the electric conductivity is increased by 3 per cent. After strongly heating copper and iron, evidences of crystallization were clearly seen.

THE MAGNETIC TELEGRAPH FORESHADOWED IN 1625.—M. H. de Parville furnishes to the *Revue Scientifique* an extract from the dialogues of Galileo, from which it would appear that about the year 1625 a rumor had become current in various countries of Europe as to the possibility of rapid distant intercommunication by means of some magnetic process—a foreshadowing of the modern telegraph. This possibility is thus indicated by Sagrado: "You acquaint me with a person who wishes to part with a secret which would enable persons, by means of certain sympathies existing between magnetic bars, to communicate with each other, although removed by distances of two and three thousand miles."

A MINIATURE INCANDESCENCE LAMP.—A small incandescence lamp for philosophical purposes has been introduced by Mr. J. C. Fuller, of Finsbury Pavement. The electrodes are zinc and carbon, and the fluid a solution of bicarbonate of potash. The cells are stated to remain active for more than thirty hours, and the expense of fresh fluid is said to be about threepence.

ELECTRO AND ORDINARY MAGNETS.—The distinction between the two kinds of magnets, briefly stated, is that in the permanent magnet the amount of magnetism is fixed, whereas an electro-magnet remains magnetic only when a current is passing round it—except that it acquires by the process a small amount of permanent, or what is called residual magnetism.

PRIZE FOR AN ORIGINAL ESSAY ON SANITARY SCIENCE.—The Worshipful Company of Grocers, of London, have issued an announcement, offering a prize of \$5,000 for the best essay on the above subject. This prize is awarded every four years, and is open to universal competition, British and foreign.

A SCIENTIFIC Convention is to be held in Philadelphia next year, made up of American Scientists, and a local committee has been organized to extend a generous welcome to the visitors.



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SAN FRANCISCO:

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Passing Events.

The severe storms and floods in Southern Cal-
ifornia and also in the great valley are some-
what phenomenal. The idea of rivers and
streams in Southern California overflowing
their banks, bridges being washed away, and
water washing around freely, seems strange.
As a general thing the complaint is of dryness.
But now the waters are out and trains cannot
pass, the passengers for Los Angeles having
been brought back here by the railroad com-
pany and sent down by steamer. There have
been floods and cyclones in the East, and cold
weather has prevailed everywhere.

The "Camar d'Alencas" boom seems to continue
without abatement, and many miners are
preparing to go there at as early a moment as pos-
sible. We have been gathering all the news
possible concerning the country for those of our
readers interested.

The mines at INL, Nevada, have never
looked better, and several claims at that camp
are daily turning out a small amount of very
rich ore, which is being sacked and shipped to
San Francisco.

The copper mines at White Cloud, Nevada,
have been sold for \$30,000, and in all probability
that canyon will have as large a smelter as is
in the State running there before next fall.

Gypsum on the Pacific Coast.

Gypsum has been discovered at many points
in California, Arizona and Nevada. The heav-
iest deposits of this mineral which have been
found in this State are in Los Angeles county,
where it occurs in beds scattered along the foot-
hills from Caliente to Long Tom, a distance of
20 miles or more. The deposits here seem to
be of good quality and abundant. Small hodies
of gypsum have been found at many points in
the Coast Range to the north of San Francisco,
and in various other parts of the State. A de-
posit of the variety known as selenite occurs
near Stockton, and within a few miles of the
San Joaquin river. Heavy beds of gypsum oc-
cur in Nevada. This mineral is also abundant
in many parts of Arizona. The gypsum-bearing
localities of that Territory are: On the car-
boniferous formations of Yavapai county, de-
posited in thin horizontal sheets; east of the
Rio Verde, about 35 miles north of Camp Me-
Dowell; in the pine country east of the Verde
settlements; on the south side of the Gila
river, 25 miles from San Carlos, Pinal county,
abundant and very white; in the Chiricahua
mountains, southwest from Cabeza Peak and
nearly due south of the Apache pass, on the
headwaters of the San Pedro, near to, if not
over, the Mexican line; on the plains of Yuma
county, 35 miles southeast from the Vulture
mine, in Mohave county, 18 miles northeast
of the Santa Maria placers. Prospectors re-
port deposits at other localities than those
named by Mr. C. P. Stanton, in "William's
Mineral Resources."

About 12 years ago the manufacture of plaster
from gypsum was begun in at the Golden Gate
Mills, in this city, where the business has been
continued ever since. The plaster sells here at
about the following rates per barrel: Hard for
finishing and general use, \$2.75; for casting
ornaments, medals, etc., \$3; superfine, for
sculptors' use, \$3.50; these being about 20
per cent less than the prices paid for the im-
ported article. Common plaster, now beginning
to be found extensively in California for use as
a fertilizer, sells at a rate of about \$12.50 per
barrel.

Notwithstanding that the crude material is so
abundant in California and adjacent regions,
most of the gypsum ground into plaster here is
imported from abroad. The imports at the
port of San Francisco, for the past 10 years,
have been as follows:

Year.	Bbls or Cskts.
1874.....	19,176
1875.....	22,782
1876.....	14,918
1877.....	14,487
1878.....	11,039
1879.....	5,408
1880.....	3,200
1881.....	3,285
1882.....	4,777
1883.....	1,203

This is imported as "plaster-of-paris." The
diminished importations of late are due to the
considerable product made by the mills in Cal-
ifornia. The principal use to which gypsum is
devoted is an agricultural one. The ground
rock or land plaster is applied as a top-dressing
to the soil, and although it does not enter to
any extent into the composition of plants, it has
still an extremely beneficial action upon plant
life and growth, from the chemical changes
which it induces in the soil. Stucco, plaster-
of-paris, or calcined gypsum, is used for making
cornices, frezes and other forms of interior de-
corations, and its use in making walls them-
selves is increasing. A fine grade is used in
taking casts of natural objects, making models,
etc.

ARIZONA COAL FIELDS.—The bill introduced
by Senator Miller of California to segregate the
Deer Creek coal fields of Arizona and open
them up to settlement is being antagonized by
Commissioner of Indian Affairs Price. Miller's
bill provides for the segregation and sale of the
coal lands to original locators at \$5 per acre.
Indian Commissioner Price desires to lease them
to Arizona speculators, believing their use
could be made a source of revenue on a royalty
of ten cents per ton for the coal extracted.
There being no precedent for leasing such lands,
Price's proposition is very unpopular among
Congressmen whose attention has been called to
it. Secretary Teller was before the sub-com-
mittee of the House Committee on Public Lands,
to whom the original bill was referred in the
House, and expressed himself as being in favor
of allowing the original locators to purchase,
and upon his statement the sub-committee has
agreed to report favorably. These coal fields
are located upon the White Mountain Indian
reservation and are very valuable. The original
locators, who are mostly miners, have been
holding them for several years against the op-
position of a very large party of speculators who
are endeavoring to possess them. Their opening
would reduce the price of coal for milling in
Arizona fifty per cent and many representatives
of Arizona miners are pushing Miller's bill.

Quicksilver Flasks.

The flasks in which quicksilver is marketed
and conveyed to the gold and silver reduction
works, etc., are made of wrought iron, and are
sent to California from Pennsylvania. New
flasks cost \$1.25 each, and old ones are
worth from 75 cents to 90 cents. They are
quite uniform in dimensions, shape and appear-
ance, and no patented forms have come into
use. Many people around mills and mines like
to "guess" at sizes and weights of these flasks,
and picking up a full one is sometimes con-
sidered rather a test of strength. The average
weight of an empty flask is 13 pounds, and each
will hold 76½ pounds of quicksilver. In the
regular type the flask is cylindrical, with a
small conical top, and the extreme length inside
is 11½ inches. The mouth is one inch, tapering
to ¾ inch at the neck. At the sides the inside
length is 11½ inches, and the inside diameter is
4½ inches at the bottom, 4½ inches at the mid-
dle, and 4½ inches at the top. The flasks are
¾ inch thick at the top, ¾ inch at the bottom,
and three-sixteenths of an inch at the sides of the
shell. For convenience in handling in trans-
portation by stages and wagons the flasks are
sometimes enclosed in leather jackets provided
with handles.

The well known trade mark "A," on top of
the flasks containing quicksilver from the
largest mine in the country, the New Alma-
den, in Santa Clara county, is secured by U.
S. patent, and registered. These flasks contain
76½ pounds of quicksilver, but foreign quick-
silver is sold in flasks containing only 75 Span-
ish pounds, equal to 76.07 pounds avoirdupois,
or 43-100 of a pound less than is contained in
flasks of "A brand." Foreign-made flasks are
undersized, badly made, and not fit for second
use. The "A brand" Quicksilver is put into
American flasks, which, when empty, can be
sold for 75 cents each.

The advantage is largely in favor of pur-
chaser of American quicksilver at equal price:

100 flasks American contain surplus, 43 lbs., at 36 cents a pound.....	\$15 48
100 flasks, empty, 75 cents each.....	75 00
Total.....	90 48
100 Spanish flasks, old iron value, 12 cents each.....	12 00

On 100 flasks, gain by purchaser of American
quicksilver..... \$78 48

The weight and purity of the product is
guaranteed, and the present price is \$29 per
flask.

Desilverizing Poor Argentiferous Lead.

The desilverization process of poor argentifer-
ous lead by the Corduric-Schnabel process in
the metallurgical works of Lantenthal, is car-
ried on, as described by the *Berg und Hütten-
manische Zeitung*, which we translate, as fol-
lows:

The alloy which is obtained by the desilveri-
zation of poor argentiferous lead (werkblei),
consisting of a zinc-lead-silver alloy, was, ac-
cording to Flaeb's process, melted together with
the basic slags in a furnace, and has given the
following results: Silver, 102.4520 per cent
against the assay; lead, 96.3415 against the
assay. The method of Corduric, which con-
sists in treating the alloy with steam, and in
submitting the remaining mixture of rich argen-
tiferous lead and oxides to a furnace, oxydation
process (*abtrennung*) yields: Silver, 104.4812 per
cent, and lead, 98.8904 per cent, against the
assay.

The combination of Corduric with Schnabel's
ammonia process consists in desilverization of
the poor argentiferous lead (werkblei) by means
of zinc, in the decomposition of the resulting
lead-zinc-silver alloy by steam, and extraction
of the oxide of zinc by ammonium carbonates,
and separating in the mixture, free from zinc,
the silver from lead, as before mentioned.

By this process, the entire amount of the
oxide of zinc is transformed into carbonate of
zinc, and regained as a by product. From the
year 1879 to 1882 an average of 105.669 per cent
silver and 99.2081 per cent lead against the
assay was yielded. Subtracting from these
figures the so-called "allowance" which is al-
lowed in favor of purchasing ores, as follows:
4 per cent loss of cupellations, 1.6 per cent, not
counting fractions 0.5 per cent, overweight, or
together, 6.1 per cent, the real yield of the sil-
ver will be 99.56 per cent. For the lead the
difference between assay and analysis 2.5 per
cent, overweight 0.50 per cent, total 3.0 per
cent, the real yield for the lead will then be
96.2081 per cent. The proceeds of the sale of
zinc carbonate covers as well the expenses of
the Corduric-Schnabel process, and leaves a
plus of 15 per cent to pay interest for the
capital put in.

Nitrate of Soda.

Occurrences.

Slight deposits of this salt (Chili saltpeter)
have lately been found in Humboldt county,
Nevada, the site of this "fud" being located
on what is known as the "Forty-mile desert"
and at a point about 25 miles east of Lovelocks
Station, on the Central Pacific railroad. This
salt occurs here in a crystallized form, deposited
in the crevices of the rocks, also imbedded in
the earth from 2 to 30 inches below the
surface. As the deposit at this point has not
yet been much developed, nor the district
about even thoroughly explored, how much of
the mineral exists here is unknown. As the
geological and climatic conditions of this
region greatly resemble those about the district
of Tarapaca, near the northern frontier of Chili,
in Peru, where the dry pampa for 40 leagues is
covered with a bed of this salt several feet
thick, it may reasonably be expected that this
valuable mineral will be found on these desert
lands of Nevada, in considerable quantity.
Here, as at Tarapaca, the nitrate of soda occurs
in an arid and almost rainless region, the
annual rainfall on this Nevada district amount-
ing to scarcely more than 4 inches, while on
the coast of southern Peru it is still less.
both localities occupy what was once the bed
of the ocean or inland sea, both have about
the same mean temperature and elevation
above tidewater, and on both are found in
heavy deposits of common salt, the sulphates
of lime and soda, magnesia, alumina, etc.,
some of the borates of lime and soda being also
found in the Nevada field. An organization
known as the Nevada Niter Company has
taken up an extensive tract of land covering
what is considered the best of these Nevada
deposits, with the purpose of exploring and
utilizing them, should enough of the crude
salt be found to warrant their doing so. In
April, 1833, a deposit of nitrate was found near
Calico, San Bernardino county, California.
Fine samples were sent to San Francisco for
examination. As yet, however, the extent of
the deposit is undetermined, and no operations
tending to its development have been com-
menced. The Central Pacific railroad carried
eastward from San Francisco 64,640 pounds of
nitrate in 1882.

Nitrate of soda is said to occur in the extreme
southern portion of New Mexico in considerable
quantity. It is deposited here by a few springs,
the greater number being in Chihuahua,
Mexico, just across the boundary line. No
disposition is made of the product, beyond the
shipment of a limited quantity to Chihuahua
by Mexicans. The following table shows the
imports and exports of nitrate of soda during
recent years:

IMPORTS AND EXPORTS OF NITRATE OF SODA.			
Fiscal years.	Imports (speci- cally valued; free of duty).	Exports.	
		Quantity —Lbs.	Value.
1872.....	\$928,079	3,100	\$124
1873.....	1,452,730	.....	.....
1874.....	1,338,141	.....	.....
1875.....	903,615	.....	.....
1876.....	1,055,360	.....	.....
1877.....	1,823,457	.....	.....
1878.....	979,322	.....	.....
1879.....	1,348,572	91,940	2,988
1880.....	1,805,110	153,936	5,773
1881.....	2,356,183	10,564	370
1882.....	a 3,911,545	429,988	14,435
Calendar year 1882.....	b 3,045,127	.....	.....

a Quantity imported, 184,534,374 pounds.

b Quantity imported, 150,297,385 pounds.

Mines on Unnavigable Streams.

Ever since mining was first commenced on
this coast, people have moved on the small un-
navigable streams where gold was to be found.
Yet, no less a personage than the Commissioner
of the General Land Office recently suggested
on deciding to cancel an application for a patent
to a mining claim, that "it is against the public
policy to allow placer mining in the beds of un-
navigable streams, and that the patentee would
obtain a right to and control over the water."

The Secretary of the Interior very promptly
remarked on overruling the decision: "It is not
necessary to discuss these points at length, I
think. It is well settled that if the beds of un-
navigable streams contain mineral deposits,
they may be appropriated for mining purposes,
and that, as to the water, the locator obtains
only an usufruct in it."

The claim was on Bear River, a very small
unnavigable stream in this State, winding
through canyons with precipitous banks, where
there have accumulated extensive placer
deposits. Some official will be declaiming
before long that miners have no rights that the
other people are bound to respect. Talking
about it being against public policy to work
placers in the little mountain streams, seems
nonsense. No richer deposits of gold ore was
ever found than those on the old bars of our
rivers in the early days.

The Worthington Pumping Engine.

Several forms of the Worthington pumps are made adapted to various purposes. The engraving on this page shows the "compound" type. This arrangement is intended for using steam expansively, which cannot be done in the ordinary form. The steam having exerted its force through one stroke upon the smaller steam portion, expands upon the larger during the return stroke, and operates to drive the piston in the other direction. This is, in effect, the same as using a cut-off on a crank engine, only with the advantage of uniform and steady action upon the water. It is recommended in any service where the saving of fuel is an important consideration. In such cases its greater first cost is fully justified, as it requires 30 to 33 per cent less coal than a high-pressure form on the same work.

A modification of this style, larger and with condenser, is used for public water works. As an evidence of the care with which this class of engines is constructed, the statement of Mr. Lawrence, President of the Charlestown (Mass.) Water Works, is cited in having said "that the cost of repairs for six years was \$100 on two pumps having a capacity of five millions of gallons a day each." Mr. A. L. Fish, the agent of these pumps for this coast, gives us some additional particulars in the form of the statements of experts as follows:

The late Alexander L. Holley, mechanical and civil engineer of Brooklyn, New York, who was consulting engineer for the Bessemer Steel Works, Troy, the Cambria, the Bethlehem, the Joliet and other iron works, made under oath a statement concerning the Worthington system of pumps, from which we make the following notes: In all Bessemer works, pumping engines for throwing large volumes of water under heavy pressure—300 to 400 pounds per square inch—are required to actuate cranes, hoists, converters and other hydraulic machinery. The hydraulic machinery is the most expensive and the hardest worked part of the plant; and the constancy and steadiness of the pumping power is the most vital feature of the whole system of machinery. Any delay or serious fluctuation in its operation in handling fluid masses of iron and steel, is fatal to the commercial success of the Bessemer process. In all these works, when in full operation, the pumping engine runs from twenty to twenty-four hours per day, rarely excepting Sundays. The strain on the engine is constant, but the velocity is momentarily and suddenly varied by the demand for water, from a low to the highest speed. Yet the pressure on the cranes, etc., is, and for safe working must be, nearly constant. The heavy pressure, by itself, puts the machinery under a severe stress; but when this pressure is also associated with great volume, requiring very large parts, the conditions of service are more severe than any others with which I am acquainted. After an extensive acquaintance with the Worthington engine, and with all such other forms of pumping engines as have been applied to the purposes mentioned, I have adopted it exclusively; and, to my knowledge, it is adopted in every Bessemer works running or building in America. I consider it, in the present state of art, indispensable to safe and regular working; and I believe that we should suffer more damage from break-downs and from delay in carrying on the conversions, by dispensing with this engine than by dispensing with any other improvement in the Bessemer plant.

The reason why this pumping engine stands this severe service without extraordinary repairs, and the reason why it imposes an extraordinary stress on the machinery it actuates, is, that the system on which it is constructed—the movement of the steam valve of one engine by the piston of the other engine—permits the water pistons to stop momentarily at the ends of their stroke, thus allowing the water valves time to seat without slamming; all this being associated with a uniform velocity of piston, and hence a uniform pressure on the water pumped, instead of a varying pressure, such as is caused by an irregularly moving piston attached to a fly-wheel. The water flows through the Worthington pump, and to the cranes, in a constant and noiseless stream. In all other pumps with which I am acquainted, when applied to such service, there is violent concussion of the water, slamming of the valves and jarring and straining of all parts, and consequently, frequent break-downs of the pump and of hydraulic pipes and machinery. I have also, for the same reasons, adopted the Worthington pump, after extensively comparing it with various other pumps for feeding boilers; and I find its advantages very marked, although not so conspicuous as in the service above described.

Two experts, J. Herbert Shadd and John F.

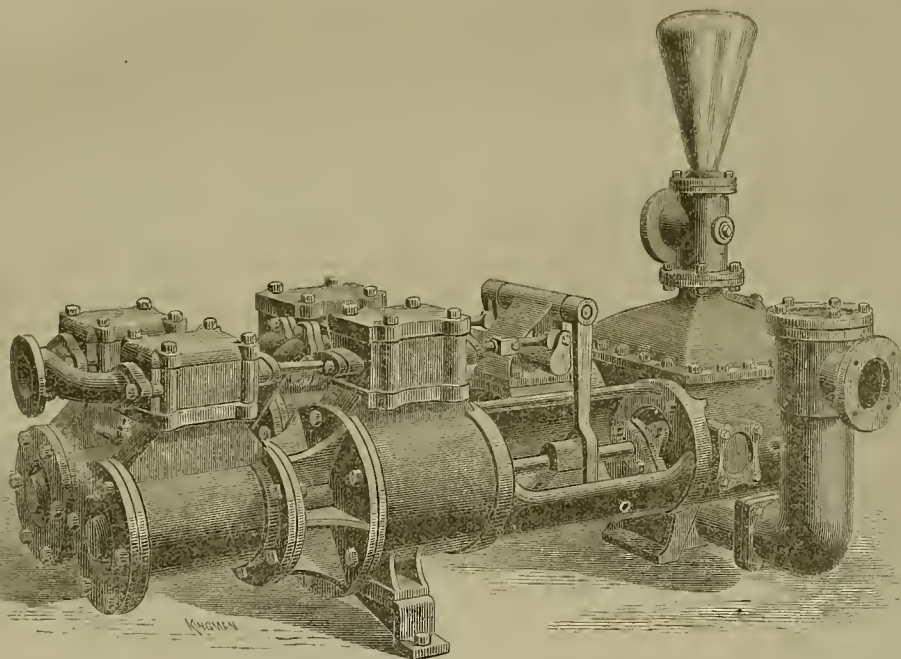
Ward, reported to the city of Buffalo Water Commissioners, the following facts concerning trials of these pumps at Buffalo:

In accordance with the request of both parties to your contract, dated the 18th day of November, 1880, the experts appointed under that contract report, in addition to their formal report of the 6th instant, as follows:

The engine was run uniformly, for determining duty, from 10:30 A. M. to 10:30 P. M. of the 12th of January, 1883. The number of gallons displaced in that time was 9,661,321-1000, or say 19,323,365 gallons per day of twenty-four hours. The contract required a delivery of fifteen million gallons of water in twenty-four hours of 77.6 per cent only of the quantity actually displaced, or in other words the displacement was 24.8 per cent greater than the required delivery.

The average pressure above the delivery valves, against which this quantity of water was pumped, was 74.90 pounds. The pressure required by the contract was 70 pounds, or 93.46 per cent of that attained during the trial. In addition to this, the engine worked against a lift of 19 feet from the surface of water in the pump well to the delivery valves. The contract required that 70,000,000 pounds of water be raised one foot high with the consumption of 100 pounds of coal. The duty performed by the engine, as reckoned from the average of the steam cards, taken at intervals during the trial, and based upon the terminal pressure in the high pressure cylinder in the usual way, was 78,319,545 foot pounds, or 11.72 per cent above seventy millions. The duty based upon the cards at cut-off, which could not be so accurately determined, was a little over seventy-nine million foot pounds.

At the request of the water commissioners, an extra pressure was put upon the force main



THE WORTHINGTON COMPOUND PUMPING ENGINE.

of the engine, after the trial for duty, and for nearly an hour the engine ran steadily, and pumped directly into the high service distribution against an artificial pressure of 80 pounds per square inch above the delivery valves, and held that pressure with remarkable regularity throughout the run. So far as could be seen, this pressure might be held indefinitely.

The engine is of excellent material and workmanship, and is larger than the contract requires. The net displacement per count is 972.09803 U. S. gallons, or 129.9506 cubic feet. The average number of counts per minute during the trial was 13,8042.1000. The number of plunger displacements in twelve hours was 39,756, and the total amount of shortages observed would be made up by the running of the engine about one-twenty-third of a second, a period of time much too small for notice. The number of observations made during the time when shortages were observed was 1368, and if we assume that in the unobserved strokes the same ratio of shortages occurred, then the whole amount of shortages occurring in twelve hours would be made up in running 1 1/2 seconds, an amount still too small for recognition in the records of the engine as taken by the observers. This shows that ten-thirty-fourths of one revolution makes up all loss at end of cylinders during twelve hours' trial.

A GENERAL STRIKE of the Pittsburg railroad coal miners against a reduction of half a cent is looked for shortly. The ruling rate is 3 1/2 cents, but in a number of instances the operators refused to pay more than 3 cents, and they claim they are unable to run pits at a profit and pay the former rate.

THE new reduction and concentrating works at Corbin, Montana, have been completed. These are said to be very complete, probably the best plant of the kind in that Territory. The estimated cost is \$60,000 and the capacity 125 tons every 24 hours.

Change in Mining Systems.

The substantial product of the Tombstone mines during the past two years, says the *Epitaph*, must stand as very strong evidence in regard to the real value and true worth of property and practically conducted mining operations, and will stand as a monument of unquestionable solidity which will doubtless do much toward establishing confidence in the permanence and profitability of our mines.

Since the earliest history of mining, new discoveries have always created more or less excitement, and for a time the value of the mines has been overrated; then would follow a season of depression; many would find that they had allowed their impulses and speculative ideas to so far govern them that they had blindly and unwittingly invested money where there was no hope of return. Mining operations carried on under the management of practical and competent men prove to the world by their substantial output of bullion, the true merit of mines. Then may be seen indications of returning confidence. And as people, through experience, learn to discriminate between the real and fictitious, and this confidence, which has been so cruelly betrayed by unscrupulous men, will be re-established and become permanent and universal. This has been the case at Tombstone, but to-day the age of impulse and speculation is a thing of the past, never to be repeated, and the great mineral deposits of our country are now regarded as fixed facts, and as treasures which may be secured by wisely developed plans, careful and practical management, and that persistent energy by which man wins all his success from that with which the bountiful hand of nature

Our Mineral Resources.

(WEEKLY REVIEW.)

The metallic domain of the United States, developed and undeveloped, is unsurpassed by any territory of the same area in the known world. We do not realize its magnitude, great value and extent, and can only estimate ourselves, without boasting, that a nation we are not only self supporting, but formidable rivals in many branches of this industry, and only second to Great Britain is the two great staples of coal and iron. Our veins, beds and deposits are diversified, and as yet comparatively virgin, comprising all of the minerals and metals known to man in apparently unlimited quantities. New discoveries of mines of fabulous richness are being made much more rapidly than earlier finds are exhausted, and the mineral portion of the territory of the United States is constantly being extended by new finds. As metal and mineral producers we have by no means reached the maximum of our producing power. We have in the brief history of our national life reached a productive standpoint that has astonished and revolutionized the world.

It is estimated that the annual production of the United States is equal to one-third of all the gold and one-half of all the silver produced by the whole world; that we are a formidable factor it is universally acknowledged, as evidenced in the coinage laws of nations which are compelled to conform to our production. Hon. H. C. Burchard, Director of the United States Mint, estimates the total production of our mines to June 30, 1883, as follows: Gold, \$1,632,364,670; silver, \$398,083,217; total, \$2,230,447,887. The year 1884 will no doubt show a considerable falling off in our gold products—California being the principal producer of this noble metal—owing to the recent decision of Judge Sawyer, adverse to the prosecution of this industry. The miners consider there are good grounds for believing, however, that this unfortunate decree will be reversed by the Supreme Court of the United States on appeal; and that his enjoiner virtually putting a stop to gold mining in certain parts of the State will have but a temporary effect, as we have not by any means reached the maximum of our gold-producing power. To destroy this industry or even check it, would be a great misfortune, for to it to a great extent we owe our present status. In this connection we do not ignore our agricultural interests, which have also been an important factor in our prosperity. But we have reason to fear that our main staple, wheat, of which we have produced and exported so largely, is no longer king, and like King Cotton which once reigned supreme in the Southern States, was deposed by a foreign production which supplied the foreign demand. Our consumption here is limited, and our Eastern brethren furnish more than enough wheat for their requirements. Consequently, without a foreign demand, we have no market for our surplus. From recent advices, it is believed that not only Russia, but India and the Persian Gulf have come to the front as large and increasing producers in this staple—as through the assistance of increased railroad facilities and cheap labor, the cost of production here is considerably less than in any other part of the world.

The following data, however, is suggestive of the values of this industry. The enumerated mines are but a small proportion of the many in California that are in actual operation.

A PART OF CALIFORNIA'S PRODUCTION FOR THE YEAR 1883.			
	Net	Gross	
	Dividend (2 mos.)	Product.	
Sierra Buttes, S. Co.,	\$1,250.00	212,018.00	
Plumas Eureka, P. Co.,	110,425.00	418,159.00	
Keystone, A. Co.,	230,630.00	461,975.92	
Padre & Empire A. Co.,			
from Dec. 29 to Jan.,	50,000.00	841,459.00	
The dividends approx.			
Standard, Bodie,	325,000.00	1,155,181.83	
Idaho, N. Co.,	31,100.00	362,000.00	
Summit, K. Co.,	58,100.00	120,010.00	
The dividends approx.	\$1,250,115.00	\$2,301,131.37	
North Bloomfield (Hydraulic) paid accrued bonds,	223,773.00		
Cash dividend,	180,000.00	506,199.53	
Milton,	78,548.18	278,923.11	
	\$1,721,442.18	\$4,286,061.04	

Or a net profit of \$1,700,442.18. The total haulion yield of the Milton mine up to Jan. 1, 1884, has been \$3,412,509.84.

However, with a reversal of Judge Sawyer's decision or Congressional aid, we will, no doubt, return to our usual prosperity with a largely increased output of the precious metal, as in addition to our hydraulic and drift mines, Milton.

The profits, as shown, for this company was realized from Jan. 1, 1883, to June 18, 1883. Since then no work has been done, owing to the action of the Milton dam.

(CONCLUDED ON PAGE 142.)

THE hydraulic miners are not letting the water run into the streams during the heavy storms prevailing for fear of adding to the flood in the valleys, but are catching and storing it in the reservoirs as usual. It will be allowed to flow down later in the season when there is less water in the streams.

ON pay day at Butte, Montana, some \$300,000 was paid out by the mining companies. The Anaconda alone paid \$120,000, and the Lexington, Colorado, Alice and Montana all put out big sums. Any camp where half this sum is paid for mining expenses ought to be very prosperous.

It is thought that fully \$800,000,000 has been produced by hydraulic process in this State.

Publication of Mining Notices.

The following circular has been issued to Registers and Receivers by N. C. McFarland, Commissioner of the General Land Office, Washington, D. C.

Gentlemen:—Your attention is called to the following extract from the decision of the Hon. Secretary of the Interior, in the case of Charles K. Miner, claimant of the Spencer lode, vs. J. G. Marriot et al., claimants of the Tabor lode, dated January 4, 1884:

"Section 2325 of the Revised Statutes requires, among other things, newspaper publication for the period of sixty days, as notice of application for mineral patent. It also provides that 'if no adverse claim shall have been filed with the register and receiver of the proper land office at the expiration of the 60 days of publication, it shall be assumed that the applicant is entitled to a patent, upon the payment to the proper officer of five dollars per acre, and that no adverse claim exists.'"

"Section 2325 prescribes the method of procedure 'where an adverse claim is filed during the period of publication.'"

"For the purpose of deciding the question raised by the appeal, it is only necessary to apply the provisions of law above cited to the facts relative to publication, as disclosed by the record."

"These are found to be as follows: The first publication for the Tabor lode was, as already stated, on the 1st of June, 1882. The adverse claim of Miner was filed on the 3d of August, 1882."

"Excluding, in accordance with a long established rule of the department, the first day, we find the 3d of August to be the 63d day of publication."

"An apparently plain and simple proposition is thus presented for consideration."

"The law requires that an adverse, to be effective, must be filed within the sixty days of publication. Miner's adverse claim was not filed until the sixty-third day. Was it filed within the period prescribed by the law, and has the adverse claimant a legal status as such?"

"This would admit of no discussion except the following facts: This department has held for a number of years (certainly since 1874) that where publication is made in a weekly newspaper, ten insertions are essential in order to show compliance with the law requiring sixty days' publication. In such cases the tenth issue falls on the sixty-third day after the first. In view of this ruling of the department, your office in October, 1879, promulgated a decision or order containing the following: 'The last, or tenth, insertion being essential, it follows that adverse claims may be filed until the expiration of the day upon which the last issue of such weekly publication is made.'"

"This rule has since been followed by your office and you therefore recognize as legal and valid the adverse claim of Miner, filed on the day of tenth issue of paper containing publication, &c., on the sixty-third day. In my opinion, the practice of your office referred to is not necessary as a logical result of the rule requiring ten insertions in a weekly paper, nor is it consistent with the law which prescribes the time within which an adverse claim may be filed."

"Section 2325 of the Revised Statutes specifically fixes sixty days as the period of publication, and says, 'If no adverse claim shall have been filed at the expiration of the sixty days of publication it shall be assumed that the applicant is entitled to a patent,' etc. The regulation requiring ten publications (in a weekly paper), thus in fact making the period sixty-three days instead of sixty, does not alter the law as to sixty days for the filing of an adverse."

"The regulation has its reason in the fact that in no other way can the law requiring sixty days' publication be complied with. Nine issues of a weekly paper would not cover the required period. It is true that the tenth insertion carries the publication three days beyond the legally required sixty days, yet for the purpose of meeting the requirement of law ten insertions are in fact necessary, since the contingency for sixty days can be preserved only by the tenth publication which falls on the sixty-third day after the first. It is also true that the applicant cannot proceed to complete his entry until the tenth publication, but this is because it is essential as proof of sixty days' publication. These reasons do not apply to an adverse claimant, and his acts are not controlled thereby. He has the plain letter of the law for his guide. His course is clear and his duty plain. He has sixty days, on any one of which he may file an adverse claim."

"If he fails to file within the sixty days of publication prescribed by the law, then he is barred."

"So far as he is concerned the question is one of simple computation."

"It would be equally plain as to the applicant except for the reasons herein given, and which do not control in considering the rights either legal or equitable of an adverse claimant."

"So far as the case under consideration is concerned, however, your decision that an adverse claim was properly received, and therefore dismissing the appeal, is affirmed. The rule of this decision should not operate to interfere with or take away any rights acquired under the law as it has heretofore been con-

strued by your office. Though that construction is, in my opinion, clearly erroneous, such fact does not render illegal any acts which have been performed in accordance with and pursuant to that construction or interpretation. Until a rule is changed it has all the force of law, and acts done under it while it is in force must be regarded as legal. This view will govern you in the consideration of any similar cases which may arise."

After the receipt of this circular at your office, you will be required to observe strictly the above ruling of the department."

Quicksilver Mining in California.

The following item, which appeared in the *Sau Jose Mercury* a few days ago, we found floating the round of the press:

The quicksilver mines in Napa and Lake counties are turning out a fair yield of that useful and valuable article. Four or five mines in that section are now being worked at their full capacity, being kept running night and day.

We thought the statement at the time exceedingly doubtful, but gave it for what it was worth, by adding the qualifying words "are said to be," etc.

Unfortunately, upon investigation, says the *Mercury*, we find the facts to be otherwise. The quicksilver mines in Napa, Lake and other counties in this State where quicksilver mines are now worked, are not turning out a fair yield, but are doing very poorly.

At the end of December, 1883, the Sulphur Banks quicksilver mine shut down, because of poor ore and extremely low price for quicksilver. In January, 1884, the Great Eastern mine, in Sonoma county, followed suit and closed its works. The *San Francisco Bulletin* of January 30, 1884, in an exhaustive article on "The Profits of Mining," says: "The Napa Consolidated Quicksilver paid [dividend] in November, and is the only quicksilver mining company in America that paid a dividend last year."

That does not look like good times for quicksilver mines—only one \$10,000 dividend for the year. This is explained by increased costs for mining, poorer ores, and the lowest price ever known for quicksilver.

We give at the close of this article a table showing the decrease in production of all quicksilver mines in this State during the last two years. It will be observed that the production for 1883 was 46,725 flasks, or 6,007 flasks less than in 1882. The average price was \$26 a flask against \$28 in 1882; the total value \$1,214,928, and divided profits \$10,000. The decrease in value of the year's production equaled \$93,456.

California cannot compete with the quicksilver mines worked by the governments of Spain and Austria. If our quicksilver mines are not protected by a fair tariff (10 per cent ad valorem present duty is too low), they must be abandoned as an unprofitable industry, and then the production of gold and silver ores in the United States will be practically controlled by Spain and Austria, for they possess the only other quicksilver mines, and as quicksilver is indispensable for working gold and silver ores, they may and no doubt will put the price of quicksilver to a point that will prohibit the working of low grade silver and gold ores.

Production of quicksilver in California 1882 and 1883.

Mines.	1882.	1883.	Deers.
Napa Consolidated.....	6,542	5,890	952
Great Western.....	5,179	3,889	1,310
Sulphur Banks.....	5,014	2,612	2,402
Redington.....	2,171	1,894	277
Great Eastern.....	2,124	1,669	455
New Idria.....	1,952	1,606	347
Guadalupe.....	1,135	.....	1,135
New Almaden.....	28,070	29,000	931
Various.....	241	185	56
Total flasks.....	52,732	46,725	4,007
Only increased.....			
Production.....	Flasks.	Price.	
1880.....	69,926	\$29 00	
1881.....	60,851	27 60	
1882.....	52,732	28 00	
1883.....	46,725	26 00	
1884.....	30,000	25 00	
Estimated.....			

Or Quijotoa, it is said that the bonanza firm is not making efforts to find water at the mines, all efforts in this direction being prosecuted by the townspeople. The finding of sufficient water to run mills is not looked for by the mine owners, who expect to ship their ore out by rail, it being thought that the passenger and freight traffic in the camp will more than offset the carrying of the ore out. It is thought that the point of connection with the Southern Pacific railroad will not be either Tucson or Casa Grande, but at Picacho, a station between the two.

THE SPRUCEMONT MINES.—On our way to Elko last week we met Mr. Sherff, one of the principal owners in the Spruceмонт mines, on the train. He informed us that the property was looking finely. They have already ore on the dumps to the value of \$80,000, by actual assays. They will put up a first-class furnace in the spring, and turn this ore into bullion. The prospects in the mines are now better than when they first struck ore. Mr. Sherff is a practical gentleman and not at all carried off by his present and prospective good fortune.—*White Pine News*.

The silver mines of Tombstone alone, since their discovery 4 years ago, have produced above \$15,000,000.

The Cœur d'Alenes.

A practical and intelligent gentleman, who has just returned from the Cœur d'Alenes and who thoroughly examined into the prospects of the new district, states to the *Butte (W. T.) Inter-Mountain*, without hesitating, his entire inability to come to a positive conclusion as to its future. He says that not even those who have wintered there know anything about the merits of the country, either in regard to quartz or placer. The ground is covered with four feet of snow and only one of the claims is accessible. The merits of the placers have not been demonstrated. They may be good or they may be worthless. The fact that in places good pay has been found on rim rock is evidence, but not proof positive that the bed rock will be rich. There is no use of men rubbing pell mell into the new country in mid-winter, and those who do so will come back broke and disgusted before the spring sufficiently opens to permit of mining operation. The railroad may boom the mines, but that is no evidence of anything except that stampedeers will be expected to pay their fare. It will take at least six months to tell whether there is enough gold in the Cœur d'Alene placers to justify any sort of stampede, and in the meantime conservative and sensible men will or should stay where they are.

From the Cœur d'Alene *Miner*, we take the following: As spring approaches the excitement over the Cœur d'Alene mine intensifies. From all over the land come letters of inquiry. Old miners are arriving on every train, some rushing into the mines at this season and others holding back until later. Men of every calling, trade and profession; of every class and condition; rich and poor, greenhorns and sharpers, all bent upon the one object of getting into the mines at the earliest possible moment, and feverish with expectation, stop off at this place and other stations in juxtaposition to the gold fields. Parties leave Spokane for the great Mecca every day—in stages, on foot, on horseback, in wagons and in sleighs. Hardly a week passes that some one does not arrive from the mines, and while they report everything quiet, yet the confidence in the yielding capacity of the diggings never wavers. Monday we had the pleasure of meeting S. E. Child, Esq., who left Eagle City Wednesday of last week. He has been through the Deadwood and Wood River excitements, and is capable of speaking intelligently upon the subject of mines and mining. In conjunction with his son, E. Child, he has a store at Eagle City. He has made several trips to and from that place, making Spokane Falls his temporary home. We had a long talk with Mr. Child, and in answer to questions propounded we were enabled to learn something of the mines and surroundings. From what he has observed during the past thirty days, he is satisfied that the richness nor extent of the mines have not been exaggerated.

Those in the mines look forward to a very lively spring, and the number is augmented daily by the arrival of fresh prospectors. He most decidedly advises men not to visit the mines at the present time unless possessed of means. Travel over the Trout creek route is accompanied with many hardships at the present time, most of the travel being done on snow shoes over a great depth of snow. While Mr. Child is not interested directly or indirectly with any particular route into the mines, he is satisfied by experience that the trail down the North Fork to the Mission, thence to the Post and on to the Falls is at present the most accessible. A route shorter and better than the others now in use can be constructed into the mines from Jackass prairie, via the Post and Mission. We may here add that that is the trail to which our business men contributed a short time ago. Captain Sanborn, one of the members of the company building steamers at the Post to run into the mines, states that the boats will commence running about March 1st, and that he can run them up the river within ten miles of Eagle City, and continue the trips for three months this spring. If a jam now existing at that point can be removed, steamers will be able to reach the mouth of Eagle creek.

E. J. Jones, writing to the *Portland Northwest News*, says: "Pritchard creek can be mined to advantage for 20 miles on either side. Miners who have located there this winter are making from \$10 to \$30 per day. I learned this from men just in from the mines. These, understand, are experienced miners. Men who have gone there this winter with from \$300 to \$700, and with no experience, will have some difficulty in wintering. All provisions are held at exorbitant prices and accommodations are of the poorest. There are now from 300 to 350 men at the mines, and this number is daily growing larger. At present the mountains are full of snow, and it would be simply a waste of time and energy to venture into this wilderness of prospective wealth before the 1st of April at the earliest. Forty-five miles north-east of Pritchard creek a new gulch discovery has been made, in a valley about one and a quarter miles wide and fifteen miles long. It is reported richer than the placers on Pritchard or Eagle creeks. Digging through seven feet of snow, prospectors discovered diggings going one and a quarter dollars a pan. A rush has already set in."

EAGLE CITY, in the Cœur d'Alene country, has been surveyed and the principal streets have been named Gold, Silver and Eagle streets.

A Water-Gas Furnace.

Mr. P. Barnes, of Joliet, Ill., recently read before the American Institute of Mining Engineers a paper on "A Water-Gas Furnace," at Elgin, Ill., as follows:

In a paper recently read before the Institute by Mr. W. A. Goodyear, a useful presentation was made of the subject of the production of water-gas on a large scale, by the use of a regenerative form of apparatus. By the way of supplement to that paper, a brief statement of the details of a plan which was carried out at the works of the Elgin National Watch Company at Elgin, Ill., may be of interest, although the ultimate result of the working of the producer was not successful or satisfactory.

This company had decided to build a gas works for the supply of illuminating gas to their factory, on a much larger scale than that of the petroleum works which had very successfully supplied the smaller buildings for many years, and in March, 1882, the material for a gas-making cupola furnace was purchased. A few weeks later it was decided to make the attempt to burn the gas under the steam boilers of the establishment, and a second set of material was ordered.

In July, 1882, when the writer took charge of the work of construction, it was agreed, after a study of the probabilities of the situation, to make an attempt to utilize the waste heat developed in the process for preheating the air-blast and the steam used, to the highest possible point, so that the fullest practicable limit of economy should be reached. This was believed to be the more needful, because of the obvious requirement that the gas should be furnished at the least possible cost, to meet the competition with coal fired direct under the boilers.

The material which had been purchased was utilized as fully as it could be in building two firebrick stoves, and the fire was put in a rectangular fire-box, which was attached to the stoves by short direct flues. The plans for this work were completed in August, 1882, and the furnace was set at work in February, 1883.

It was soon found that although the proposed preheating of the blast and of the steam was very fully accomplished, yet the shape which had been adopted for the fire box was not such as to secure the intense concentration of the heat needed to secure the complete fluxing of the furnace which had been undertaken. It was also found that the chilling of the slag, which was run down in considerable quantities by the steam blown in during the gas making, was so complete that it became quite unmanageable, and that it would lodge in the base of the fire box below the line of fusion, and also above this point, with so little fuel remaining in or near the masses of slag that they could not be remelted when the blast was turned on again. This action of the steam in cooling the slag was anticipated, but the trial was thought to be worth making.

A considerable quantity of gas was made in the furnace with the regenerative fixtures as first erected, the holder which had been provided for the storage of the illuminating gas being used for the fuel gas during the trials which were made. This was burned under the boilers, using simple perforated iron pipes for burners. A considerable evaporation was reached, but it was found that in order to compete with direct coal firing, even with the market price then current for coal used under the boilers, of \$5 per ton, the gas must be furnished for decidedly less than 5 cents per thousand cubic feet, even if the cost of labor, as compared with direct firing, were to be wholly omitted in making up the estimate.

The saving of the waste heat was found to be very complete, the products of combustion and the water-gas both escaping from the apparatus at a temperature very close to the boiling point of water.

It was found that the splintering of the brickwork in the lower part of the fire box, due to the removal of the very stubborn clinkers which were formed, would lead in any event to a very short life of that part of the apparatus as then constructed, and in view of some other important local reasons it was considered advisable to abandon the regenerative fixtures, and the expectation of using the gas under the boilers. The furnace was then rebuilt and fitted up for making illuminating gas only, upon the plan which had been used for some years in Chicago under the patents of Mr. T. G. Springer. The whole was put into very successful operation in July, 1883.

MR. ROBERTSON, superintendent of the jute mills in East Oakland, has just received three sack sewing machines from Dundee, Scotland, and is setting them up in the mills. They are the first that have ever been introduced into this country and are very expensive. They cost about \$1,300 each in Scotland, and laid down here including duty and freight will cost in the neighborhood of \$1,500 each. The mills are running on full time now with over 350 employees, and owing to the pressure of work and the immense orders on hand are running until nine o'clock at night, three times a week. In addition to the manufacture of sacks, the company is turning out a fine quality of matting and stair carpeting, manufactured from jute,

THE ENGINEER.

USEFUL INFORMATION.

A Fireless Locomotive—A New Idea.

Mr. Hougman, says the *London Engineer*, constructs an engine in which the steam is supplied by evaporation from a charge of water which is furnished to the boiler at the station, and there brought up to the required temperature and pressure. The shell of the boiler is surrounded by, or may inclose, another vessel, between which and the boiler a narrow space is left, which is filled with caustic soda. The exhausted steam is discharged into this mass of soda, which at once absorbs it, and the absorption gives rise to a large amount of heat, which is in turn given out, and returned to the water in the boiler, where it produces an additional quantity of steam; and the latter, being exhausted into the compartment containing soda, gives rise to additional quantities of heat; and thus the process is continuous, and the locomotive continues to exert its power, until the solution of soda becomes so far saturated that it can no longer take up the exhausted steam and supply heat to the boiler with sufficient rapidity to enable the engine to do its work. When this state of affairs is reached, the engine is recharged, and is again sent out on the line. The soda removed from the exhausted engine is placed in an evaporator and deprived of its moisture, and is then again ready for further service. This seems to be the first attempt to make practical application of the new well known principle discovered by Faraday sixty years ago, and probably even earlier known on the continent of Europe.

MODERN ENGINEERING.—The new harbor of Trieste, which has lately been finished with great ceremony, is a remarkable piece of modern engineering. It has taken fifteen years' work, and has cost over \$7,000,000. It consists of nearly two miles of quays, arranged to inclose three basins of eighty five acres of water surface, and these are protected by a 3,600 feet long seawall, running parallel with the shore and 1,000 feet from it. The work has been one of enormous difficulties, because of the unstable bottom, and it is stated that the walls, when once under way, sank gradually for a year, then suddenly slipped forward and out of sight. But the present walls have already withstood two of the greatest gales known in this century. The importance of this work to Austria must be very great. It is the chief seaport of the country, it has a large mercantile navy, and its exports foot \$50,000,000 a year, and its imports \$70,000,000. But its little harbor, constructed by Maria Theresa in the last century, has been entirely inadequate to its steadily growing commerce. No vessels of more than three hundred tons burden could come to its quays, and though larger craft could find generally safe anchorage in the outer roadstead, they have been exposed to danger from southerly storms. The new piers now make it possible for vessels of any size to find safe shelter in the harbor of Trieste.

SIMPLE AND COMPOUND ENGINES ON SHORT ROUTES.—Mr. Boulvin has determined a series of formulas expressing the relations between size of vessel, weights carried and distances traversed, and the weights of the simple and the compound engine, and finds that, for short routes, the best form of engine is the single cylinder rather than the compound. He finds that for lines from twenty to sixty miles in length, as those from Dover to Calais and from Ostend to Dover, a gain of a knot an hour may be obtained by the use of the simple engine instead of the compound, in consequence of the saving in weight of machinery. On long routes the economy is on the side of the compound engine, in consequence of the saving in weight of fuel. The later practice of English constructors has been in accordance with this result, and with the principles involved in the work of Mr. Boulvin. He constructs curves showing the equations graphically, and illustrates their use by examples.

THE NICARAGUA CANAL PROJECT.—Washington dates of January 20th, say: Friends and promoters of the Nicaragua ship canal, both here and in Nicaragua, feel sore over the practical failure of that enterprise, so far as this country's control in it is concerned, and ascribe it to the selfish opposition of Captain Eads on the one hand and rival railroad interests on the other. Whatever the reason, lacks of success is evident and must be accepted as a fact. The Nicaraguans do not despair, however, of yet fulfilling their scheme of a canal, and are seeking the necessary aid abroad. Meanwhile M. de Lesseps, according to all reports, is going ahead with his ditch at the Isthmus of Panama, and that genius at digging may yet show the world how simple a thing it is to accomplish an impossibility, provided the right man sets about it in the right way.

The *Engineer* of a recent date says: The whole of the network of the Belgium telegraph will be appropriated for telephonic communications within a period of four months.

AN EXPENSIVE RAILWAY.—The underground railway system, which will soon encircle London, costs \$15,000,000 per mile.

Horse-Power of Boilers.

Strictly speaking, there is no such thing as "horse-power" to a steam boiler; it is a measure only applicable to dynamic effect. But as boilers are necessary to drive steam engines, the same measure applied to steam engines has come to be universally applied to the boiler, and cannot well be discarded. In consequence, however, of the different quantities of steam necessary to produce a horse power with different engines, there has been great need of an accepted standard by which the amount of boiler required to provide steam for a commercial horse-power may be determined.

This standard, as fixed by Watt, was one cubic foot of water evaporated per hour from 212 for each horse-power. This was, at that time, the requirement of the best engine in use. At the present time, Prof. Thurston estimates that the water required per hour, per horse-power, in good engines is equal to the constant 200, divided by the square root of the pressure, and that in the best engines this constant is as low as 150. This would give for good engines, working with 64 lbs. pressure, 25 lbs. water, and for the best engines, working with 100 lbs., only 15 lbs. water per hourly horse-power.

The standard, therefore, adopted by the judges at the late Centennial Exhibition, of 30 lbs. water per hour, evaporated from 212 for each horse-power, is a fair one for both boilers and engines, and has been favorably received by engineers and steam users; but as the same boiler may be made to do more or less work with less or greater economy, it should also be required that the rating of a boiler be based on the amount of water it will evaporate at its most economical rate.

A fault frequently met with in steam boilers is the carrying over of water mechanically mixed with the steam, which water not only carries away heat without any useful effect, but, when present in any marked quantity, itself becomes a source of danger and of serious loss in the engine. Many boilers show a high apparent evaporation in consequence of furnishing "wet steam," while practically they are anything but economical. Parties have been known to claim an evaporation of 19 to 20 pounds per pound of coal, where the highest practically possible is not over 13. Such boilers are dear at any price.

The cause of priming may be either impure water, too much water, or improper proportions in the boiler. When a boiler is found to form wet steam with good water, carried at a proper light, it is a proof of wrong design.

The amount of priming in different boilers varies greatly, and as yet there is not sufficient data to establish any definite ratio for boilers in ordinary use. The experiments of M. Hirn, at Mulhouse, showed an average of at least 5 per cent; Zeuner sets it down as approximately from 7½ to 15 per cent, while the careful experiments at the American Institute in 1871 show in cylindrical tubulars 7.9 per cent.

WIRE ROPE.—Wire rope of the same strength as new hemp rope will run on the same sized sheaves; but the greater the diameter of the sheaves, the longer it will wear. Short bends should be avoided, and the wear increases with the speed. It is better to increase load rather than speed. The adhesion is the same as that of hemp rope. Wire rope should not be coiled or uncoiled like hemp rope, but should be wound upon a reel. When substituting wire rope for hemp rope, it is well to allow for the former the same weight per foot which experience has approved of for the latter. As a general rule, one wire rope will outlast three hemp ropes. To guard against rust, stationary rope should be oiled once a year with linseed oil, or kept well painted or tarred. Running rope, while in use, requires no protection. Where great pliability is required, the center or core of wire rope is made of hemp, and small sized rope is generally made with hemp centers. Running rope is made of fine wire, and standing rope of coarse wire. Wire rope made from charcoal-made iron is fully one-fourth stronger than the ordinary rope. The standing rigging of a vessel, when composed of wire rope, is one-fourth less in weight than when of hemp.

A **TROULAR SAW** was recently sent from N. Y. to a Michigan match company, which was six feet in diameter. It has fifty-two teeth and makes 672 revolutions per minute, and is capable of making a ten-inch to twelve-inch cut with each revolution. It can saw off a forty-foot plank, therefore, in an infinitesimal portion of a minute. This is not a solid saw, but is one of the new patterns, in which the teeth are separate from the plate and can be inserted and removed at pleasure. The teeth in the sort of saw of which this monster is a specimen, are little curved bits of steel pointed like chisels at the cutting end. They fit into round sockets cut out of the edges of the saw plates, and their little chisel blades project slightly beyond the circle of the plate.

SPLITTING OUT GRANITE.—The final rupture between a rock of granite and its ancient bed is an interesting process. Let us suppose the two cuts to be made, one nearly vertical, and the

other, or horizontal one, at right angles to it, and both one or two feet deep. A series of wedges is then inserted into the openings, and a man with a heavy hammer goes along, tapping them lightly one after another. As they are driven in, the men listen sharply for the effect, the crack gradually widens, the great mass of stone begins to heave and swell under the strain, the quick ear of the expert detects the critical moment, and a simultaneous blow on all the wedges throws the monster loose. Now and then, of course, a failure is made, and the block splits in two. But the judgment of the workman is singularly correct, and the block is generally thrown out in its full integrity.

USED RAILROAD TICKETS. The number of tickets collected by a first-class railroad, in the course of the year, says the *Springfield (Mass.) Republican*, is something stupendous. Five tons of these trifling paper slips accumulate in the Boston & Albany railroad office in Springfield yearly, and yield a snug sum when sold for paper stock. The colored tickets are bundled up by themselves in neat packages, and the white ones in separate lots, the latter, of course, bringing the highest price. But there is many a slip between agent Briggs' department and the pulp-room of a paper mill; in fact, the danger of having tickets used twice is so great that those collected for several years have been allowed to accumulate in a vacant room near the roof of the company's massive granite building. Three months ago a ticket cutter was added to the road's equipment, and meanwhile one man and two boys have succeeded in chewing up eight tons of tickets. A good winter's job remains, however, at least ten tons more being ready for mastication.

LITHOGRAPH STONES.—Mr. Stuart, of Edinburgh, proposes to strengthen stones which have thus been weakened by applying to them a backing of granolithic. This material, it appears, when placed in contact with a roughened surface, adheres with such tenacity as to form, with the stone it is attached to, one solid mass. Its capacity for sustaining pressure is known to be great, and if additional strength should be required bars of steel can easily be introduced while the material is in a soft condition. Treated in this way, a lithographic stone of an inch in thickness becomes thoroughly serviceable, and will, it is said, continue so till worn almost to a film. Blocks of the ordinary thickness thus become capable of furnishing the material for two or three printing stones, while slabs that would otherwise be too thin for use can be turned to profitable account.

GOLD JEWELRY may be cleaned and be made very bright in this way: Line a small tin cup with soft paper, fill with urine suds, put the jewelry in (one piece at a time, of course), shake it about well, rinse with clear water, and dry with a piece of chamois skin.

GOOD HEALTH.

How a Man Dropping One Thousand Feet Feels.

With regard to the recent sad suicide of a girl by leaping from one of the towers of Norte Dame, Dr. Bromardell's expressed view that asphyxiation in the rapid fall may have been the cause of death, has given rise to some correspondence in *La Nature*. Mr. Bontemps points out that the depth of fall having been about 66 metres, the velocity acquired in the time (less than four seconds) cannot have been so great as that sometimes attained on railroads (e. g., 106 feet per second on the line between Chalons and Paris, where the effect should be the same), yet we never hear of asphyxiation of engine drivers and stokers. He considers it desirable that the idea in question should be exploded, as unhappy persons may be led to choose suicide by a fall from a height, under the notion that they will die before reaching the ground. Again, Mr. Gossin mentions that a few years ago a man threw himself from the top of the Column of July, and fell on an awning which sheltered workmen at the pedestal. He suffered only a few slight contusions. Mr. Remy says he has often seen an Englishman leap from a height of 103 feet into a deep river; and he was shown in 1852, in the island of Oahu, by missionaries, a native who had fallen from a verified height of more than, say, 1,000 feet. His fall was broken near the end by a growth of ferns and other plants, and he had only a few wounds. Asked as to his sensation in falling, he said he only felt dazed.

Border-Land of Insanity.

The doctrine that the border-land of insanity is a very narrow one, and that most sane people are near the line, has been extensively taught during the last quarter of a century. Now, the truth is, there is a broad line between sanity and insanity, and that "all men are mad" is not true in any reasonable sense. There are, however, a large number of persons who have an insane impulse to do some wicked deed—to kill themselves or somebody else, to jump into the sea if on a vessel, to throw themselves from a height if on top of a building or on the border of a precipice. Only recently, while listening to a lecture on insanity by one of the most

noted neurologists in New York, he stated an experience of his own, and said that once while visiting some romantic scenery in the great West, he desired to look down a deep precipice. He laid down flat on his face close to the edge of it and gazed into the depths below. To his utter amazement he was seized with a desire to throw himself down the abyss, and lost the power of restraint. He called vigorously to his friends near by to drag him back, and this alone saved him from the deed. While, however, such impulses are frequent, we believe they do not trouble the peace of mind of the majority. Such as have them should strengthen their nervous systems by culture, strengthen their wills and take good care of their brains. —*Herald of Health*.

THE BEST REMEDY.—Those who are afraid of epidemic diseases may feel comforted on hearing that one of the best protective measures they can resort to is a very simple one—the use of soap and water. An eminent physician says: "It is worth while for common people to learn that 50,000 typhus germs will thrive in the circumference of a pinhead or a visible globule. It is worth while for them to note that these germs may be desiccated and be borne like thistle seeds every where, and, like demoniacal possessions, may jump noiselessly down any throat. But there are certain things spores cannot stand, according to the latest ascertained results of science. A water temperature 120 degrees boils them to death, and soap chemically poisons them. Here sanitary and microscopic science come together. Spores thrive in low ground and under low conditions of life. For redemption, fly to hot water and soap, ye who live in danger of malarial poisoning. Hot water is sanitary; soap is more sanitary. Fight typhus, small-pox, yellow fever and ague with soap. Soap is a Board of Health." "Cleanliness is next to godliness," and so far as physical health goes, far in advance of what passes current for godliness in this wicked world. But, as a matter of fact, it is a poor kind of godliness that does not make people cleaner as well as better. Daily contact with soap and water will help wonderfully in properly regulating the habits of everyday life.

A NEW MODE OF BURIAL.—At the recent general assembly of cement manufacturers at Berlin, Dr. Fruhling described a new application of cement. He explained that it would be easy to transform corpses into stone mummies by the use of Portland cement, that substance when hardened not in any way indicating the organic changes going on within it. He further illustrated the subject by describing various industrial uses of lime as a preventive of decomposition. The cement in hardening takes an accurate cast of the features which it incloses, thus allowing of their exact reproduction after the lapse of centuries. It is suggested to use coffins of rectangular shape, it being further considered by Dr. Fruhling that underground sepulture is needless, as the coffins soon become practically masses of stone, and can therefore be built into pyramids.

COPPER AND LEAD IN FOOD.—A. Gautier shows that copper is little calculated to produce mortal results. The solubility of most of its salts, their marked color, nauseating taste, and emetic action give at once warning. The salts of lead, on the contrary, have no pronounced taste, or are even sweetish. They are in general colorless. If introduced into the system, there is no alarming effect until the nervous centers, the liver, and the blood have become interpenetrated with the poison. All foods sold in tins, especially if of a fatty nature, public water supplies, wines, beers, effervescing drinks, the glaze of earthenware, enamels, and especially culinary utensils lined with tin, may introduce lead into the system.

DANGER AT THE GRAVE.—The *London Telegraph*, in speaking of the danger of uncovering the head at the grave on the occasion of a funeral, says: Many of the distinguished and more elderly mourners at the interment of the Duke of York died from bronchitis within a few weeks of the royal obsequies: the Marquis of Londonderry's funeral in Westminster Abbey in 1822 was equally disastrous to the aged or delicate among those who gathered round his tomb; and the funeral in Pere Lachaise of the celebrated French juriconsult, M. Robert de St. Vincent, is said to have decimated the senior ranks of the Paris bar, one of the victims being Brillat Savarin, the author of the "Physiologic du Goat."

DANDRUFF.—Dandruff is a disease of the scalp and a very common affection. The causes are numerous. It may arise from want of cleanliness, infrequent brushing with a soft brush or too much brushing with a hard one, poor health, a dry scalp, wearing a close, unventilated hat, the use of a fine-tooth comb, an instrument which ought to be banished from the toilet. Avoid these causes and keep the head clean, and the disease will generally disappear.

DIED FROM EATING WILD PARSNIPS.—The *Boise (Idaho) Democrat* says a man named Peterson, who was in the mountains getting out timber, roasted and ate a lot of wild parsnips, and in an hour afterwards died in great agony.

EAT SALT WITH NUTS.—Always eat salt with nuts. It renders them easy of digestion and greatly improves their relish.

Our Mineral Resources.

(CONTINUED FROM PAGE 139.)

which are comparatively virgin, our gold quartz mines are rapidly being developed with a constantly increasing yield. The large proportion of this class of mines are worked by close corporations, and it is difficult to ascertain their output and net results, as their business is never published to the outside world, owners being satisfied with the mines that they own as investments and not for sale.

Where the conditions are favorable, large ledges of low-grade gold ores can be profitably worked in California. A multiplicity of stamps, modern improvements and gravity for handling ores and water power are all the requirements. The most notable instance is the Melone mine, in Calaveras county, owned by Grayson and Borland. The vein is 100 feet in width. It is worked by an open quarry and a 40-stamp mill crushing three tons to the stamp. The ore pays \$1.60 per ton; the expense for mining and milling is 90 cents per ton, leaving a profit of 70 cents per ton. The owners contemplate erecting 100 more stamps which would crush 12,600 tons per month, leaving a net profit of \$8,820—that is, providing Sawyer, Cadwalder & Co. do not object and enjoin the work.

Silver.

Notwithstanding the celebrated Comstock ledge of Nevada has ceased to be prolific other than in a small way, Nevada has many other districts that are coming into notice as prominent producers. A large extent of country is on the line of the Carson and Colorado Railroad, comprising the districts of Lyon, Churchill, Mono, Esmeralda, Inyo and San Bernardino counties—particularly the last three named. The mines of these counties have hitherto, owing to their inaccessibility and remoteness from a base of supplies, through the want of railroad facilities, been laying idle or feebly worked.

Inyo county of California, contains prominent mines of both gold, silver, silver-lead, copper, sulphur, salines, deposits of borates, soda and common salt in immense quantities. The district of Cerro Gordo has formerly been a large producer of silver-lead. It has been estimated that \$1,500,000 of values has been taken from this district alone until 1872, when a cessation of work occurred from litigation, which is now settled, and the mines are being rehabilitated and producing. The Keystone group of gold-producing mines at Beveridge district have produced over \$300,000 in the past thirty months, and is still in bonanza. Lookout and New Coso districts are steady producers of silver-lead, with many other localities of note in this and San Bernardino district. Arizona, New Mexico, Oregon, Idaho, Wyoming, Utah, Colorado and Montana are steady producers of both gold, silver, lead and

Copper.

Of this metal and its products until recently we have been large importers, and dependent on a foreign market for our supply. In 1845, we produced only 100 tons; since that time our production has so rapidly increased that within the past twelve months we have entered the markets of the world as exporters and regular contributors. Great Britain is the great center of the copper trade, and has hitherto made and controlled the market without competition. But at date the United States has become an important factor, and at any time if disposed can advance or depress the market, as her resources are almost unlimited and supply inexhaustible. The production of copper in the United States from 1845 to 1883, inclusive, has increased from 100 tons to 58,000 tons per annum, at an estimated valuation of \$17,000,000, of which we have exported at least 15,000 tons for the year 1883. The highest price paid for lake copper for the past nine years, has been 25 cents per pound; the lowest, 14; the average, 19 cents per pound. From the rapidly increasing consumption of this metal in the arts, there can be but little doubt but what it has touched its lowest point and an advance is in order; as, as the minimum price stated, this metal can only be profitable produced by mines favorably situated in reference to railroad transportation, and a free smelting ore of high grade (carbonate and oxide) with other conditions in keeping.

However, fortunately for this industry, we have mines so situated that give promise of a long lease of life, some of them being successfully worked while others are lying idle, and have not as yet even erected a smelter. A case in point is a mine that the writer recently visited in Santa Fe district, Esmeralda, Nevada, within a few miles of the line of the Carson and Colorado Railroad previously alluded to. This district is extensive, comprising an area twenty miles in length by ten in width, and is essentially a copper district and belt. The most prominent and noted mine is the

Copper King.

Though but little developed there has been sufficient work done to form a very correct estimate of its great value and wonderful richness. The vein shows a width of 100 feet, and exposed on its line of strike for 1,500 feet, and so favorably situated that it can be worked for years by open quarry. The ores are oxides, carbonates and silicates, entirely free from arsenic, or antimony. They carry their own fluxes and will give an average assay of from 15 to 18 per cent as taken from different parts of the lode. Estimating them at 12 per cent, they can be reduced to black copper and transported to a

market at a cost not to exceed 8½ cents per pound of metal produced. At 15 per cent, a much less figure, which is worth at current rates in New York 13½ cents per pound, netting a profit of over 100 dollars per ton.

Of this class of mines, the Copper Queen of Arizona ranks as a heavy producer. Their ores range from 13 to 16 per cent (carbonates and oxides). This company has paid in dividends over one million dollars to date. It costs them to produce copper from 9 to 9½ cents per pound. This mine has a bright future with large reserves. Of the Lake Superior mines, the Calumet & Hecla is the most prominent and the largest producer in the United States—the average cost of production does not vary much from 7 cents per pound. This branch of mining has met with extraordinary success, as evidenced by the following data. The North Western Mining Journal is authority for the following statements:

Lake Superior Mines for 1882

	Capital.	Dividends.
Atlantic.....	\$ 180,000	\$ 80,000
Calumet and Hecla.....	1,200,000	2,000,000
Central.....	100,000	50,000
Oceola.....	880,000	250,000
Quincy.....	200,000	520,000
	\$2,560,000	\$2,900,000

For 1883 the yield was fully equal to 1882. Since the commencement of mining operations the above named companies have paid dividends aggregating \$28,140,000, or nearly eleven times the amount of their full paid up capital.

Lead.

The extension of our railroad system serves to constantly open up new districts that come forward as producers. Our output of this metal has not reached its maximum, and from present appearances we shall soon be again exporters.

The production of the United States from 1825 to 1882 inclusive, as computed by Whitney & Caswell, has been 1,589,580 tons; the highest price since 1875 has been 6.75 cents, per pound; the lowest 2½ cents per pound. The average for 1882 and 1883 was 4.46 cents per pound. At 4½ cents per pound foreign lead cannot be brought into competition with the domestic article. Lead producers should guard against over production and produce no more than our consumption demands.

Quicksilver.

The production of California for 33 years, ending Dec. 31, 1883, was 1,310,678 flasks of 76½ pounds each. During that time we have exported 934,233 flasks. California's production for the year 1883 was 47,000 flasks, of an estimated valuation of \$1,215,000, of which the New Almaden mine produced three-fifths, 29,000 flasks. Other mines produced 18,000 flasks. The world's production for 1883 was 115,000 flasks (from Spain, California, Austria and Italy). The mean price in California for the past two years has been 36½ cents per pound. The approximate value \$2,713,963. Previous to the discovery of quicksilver in California, that great financial power, the Rothschilds, of London, held the monopoly of this product, obtaining their supplies from the Almaden Quicksilver mine of Spain, by virtue of a \$110,000,000 loan made by them to the Spanish Governor, the interest sinking fund to be paid in quicksilver. This mine having been the principal producer of this metal in the world to date of its discovery in California, they furnished and regulated the supply and price according to the demand.

Young and mercantile America, by their large output, stopped their little game and made a barometer and thermometer of their own, reducing the temperature of the market from \$1.50 to 34 cents per pound—a price so low that there remains but very little of any profit for the producer. Our mines have been prolific, but we are simply working for glory and stubbornness, exhausting our supply without adequate compensation. Many of our mines have closed down. This industry could be made profitable and remunerative to all by a combination regulating the supply to the demand. It has been often attempted, but conflicting interests on the part of the producers as often prevented it. Rule or ruin, has been the law. In 1879 the writer visited New York, representing nearly all of the outside producers, for the purpose of effecting a consolidation of these great interests on a compromise basis of keeping the production within the limits of the consumption and a regulated scale of prices. But the scheme failed, as the principals of the principle producer—the New Almaden—did not see fit to join the coalition. They are now masters of the situation, the weaker having been compelled to retire and close their mines. The tariff does not protect this industry, it should be increased, to be of any benefit, to at least 20 cents per pound—it is now 10 per cent ad valorem.

Coal.

The United States is second only on the list of coal producers of the world, new beds or fields being discovered and old ones still prolific. Our coal area is rapidly increasing. The time is not far distant when we shall have reached a point when our annual output will not be surpassed by the oldest and most favored producer of this indispensable mineral. Already the area of our coal beds is larger than any other known in the world.

Iron.

The extraordinary rapid strides that we have taken in the development of this important industry, within the past 20 years, is a remark-

able feature. At date we are second only to the principal producer of the world—Great Britain—and still our production is not yet large enough to meet our requirements. Our imports from other countries are a heavy item. Our constantly increasing railroads, spanning and gridironing our possessions, are still heavy consumers. We are yet in our infancy, and our requirements great, notwithstanding our immense beds, deposits and veins of all the varieties of ores of this metal to draw from. We consume faster than we produce and are consequently steady and heavy importers.

Petroleum and its Products.

We imported for 12 months, ending Dec. 31, 1883, 533,134,100 gals., its value \$47,761,626, with the whole world for a market, our importations last year being the largest ever known, the result being that foreign markets have accumulated large surplus stocks. Our production was considerably less than the year 1882. California is not only a producer in part supplying home demand with illuminating oil and lubricants, but we are exporting to a limited extent with a constantly increasing production. Our oil producing area is large and being rapidly developed. In the four great staples of lead, petroleum, quicksilver, borax, soda and other saline and alkali products, our production has been so great and the sources from which we draw our supply so large and apparently inexhaustible that we have to a great extent completely revolutionized the market values of the world and are largely masters of the situation.

In connection with our oil fields, their apparent extent and promising future, we are forcibly reminded of Prof. B. Silliman's report on the values of these lands nearly 20 years ago. At that time, however, the precious metals in California were the rage and oil was let severely alone, and some of the Professor's friends thought him over sanguine. We are astonished at the extraordinary accuracy with which his report on the Bodie mines has been verified—at that time there were no prominent mines opened there and Professor Whitney and his corps of experts examined and pronounced the formation non-metaliferous and that values to any extent could not exist in so forbidding a formation. Time, however, sometimes produces great changes and it is possible oil has accumulated, and that the enormous yield of the Standard and Bodie have grown since Whitney examined these districts. NMAN.

Prejudice of English Miners.

Mr. Geo. G. Andre, in one of his series of "Continental Colliery Notes," published in the *Colliery Guardian*, says: "The greatest obstacle to progress is prejudice, and it is an unfortunate fact that prejudices are more deeply rooted in Englishmen than in any other highly civilized people. This truth has been impressed upon me in my journeyings to and fro among the various mining communities of Europe. The difference in this respect is unpleasantly apparent; and the contrast becomes more striking when we travel westward to the United States of America. It is extremely difficult to induce the English miner to modify his practice even in a small degree, whatever the advantage may be that is to result from the modification, and utterly impossible to persuade him to make a radical change. But this peculiarity places him at a disadvantage with the foreign producer, who is not only ready to adapt his practice to the exigencies of the times, but who is ever on the look-out for means to enable him to get the better of his competitors in the market. The Americans—to whose enterprise and inventive genius the world owes so much—have discovered this weak side of the English character, and they are, in consequence, taking their inventions to other countries first. I met an American a few days ago traveling to the Continent with some important improvement in mining machinery. "Why do you not offer it here?" I asked. "Just this," he answered, "if I were to stop and offer it to your people here they would not look at it till about the time my patent rights came to an end, in twelve years' time. It is too much a change for their conservatism to get over in much less time than that. That's my experience of your mining people, anyhow."

DECOMPOSITION OF THE CHROMATE OF IRON.—The decomposition of the chromate can be done with fused hydrate of potash or chlorate of potash in a silver crucible, extracting with water, heating of the exsiccated residue, extracting the iron oxide with hydrochloric acid and reiteration of the decomposition process in the same way. The estimation of the chromic acid is done by letting the potassium chromate solution run in an acid solution of ferrous sulphate, and reiteration with potassium permanganate. A good silver crucible can stand about one hundred decomposition processes.—*Fresenius Zeitsch.*

PERHAPS the most forlorn and uninviting village in Nevada to-day is Grantsville, in Nye county. The mines for which the town was built are all idle, and many of them abandoned. The few people who remain exist by the hardest work, and, Micawber like, are waiting and hoping that something will turn up. There are few sights more deplorable than the wreck of a once flourishing mining camp.—*Reno Journal.*

Bodie.

(From our Traveling Correspondent.)

The famous bullion producing district of Bodie, Mono county, Cal., after a partial subsidence in the blow, or rather a diminution in its quantity of bullion output, is now beginning to attract marked attention, even across the continent. A month since, the secret barely got out to the community here, as a published fact, but for several months previous a few on the inside of the mine, and their special friends, were aware of a very rich strike, and very cautiously covered it up and pushed on the prospecting to make more certainty of the extent of the bonanza they had struck. The results were so very good, that their anxiety to secure large amounts of stock, and the telegrams in that line of business poured into San Francisco so rapidly that the officials, and stockholders, soon suspected something had occurred and investigated the internal workings of the mine, to see if the reportings had not been too meager, if not radically defective. President Levitt hastened up, and probably sent back a telegram letter—"I came, I saw, I conquered" the situation; and we will soon re-open the hidden veins—and when all things are ready, we will slaughter the fatted calf, and astonish the world with a boom for Bodie such as the former, only much larger."

The mine is open only to those holding special permits. Those who have seen this rich ore body, and also saw the one that caused the former boom some years since, say this is larger and richer. The community here seems to be a unit on the matter of the strike being a great and promising lead of rich silver and gold bearing ore.

Some who sold Bodie stock just before the general public became acquainted with the facts, for less than fifty cents a share, are now investing at very much higher prices.

Yesterday was one of severe storm, snowing and drifting, but it did not prevent even females facing the elements to gather up their fragments of hoarded gold dust and to convert all available into cash or hawkable shape, and hasten to the hawk for Bodie stock. One boarding-house lady is reported to have 1,000 shares, which she secured at low rates by getting points very early and using them. At this moment I hear in the next room the usual salutation, "How is Bodie to-day?" The lady's reply is prompt, for she is a Bodie stockholder, who keeps well posted on the hourly fluctuations in the stock, and has the fullest assurance of its reaching \$20 soon.

Through the courtesy of Superintendent Wm. Irwin I was permitted to visit the mine to the 500-foot level, and see one large body of milling ore, that appeared to be two large veins at their junction; but this was not the rich strike causing the excitement, though it may prove to be of greater permanent value. I also saw one cut or upraise cutting through a very rich vein of silver ore and above that, and near the hanging wall was a stratum of ore, from one to two inches thick, with gold visible. This strike of rich ore in connection with a large mass of good milling ore that constitutes the full ledge at this point of cutting, is ample to assure an actual value to the stock—but the real Bodie strike probably on another level, I was not permitted to see. To give an idea of the thorough discipline of the foreman and operatives employed now in the Bonanza mine, I was not allowed to bring away even a piece of wall-rock—and the really gentlemanly foreman assured me that it would be his grand satisfaction to select for me the choicest specimens of the mine if he could read just such an order from the office. Personally he would not have the least objection to answer questions, as to the richness and extent of ore deposits, or to my taking ore samples across the ledge for assay test of value of the ledge, but he was simply acting under restricting orders, and I fully appreciated his fidelity and his courtesy; and saw enough of the mine to show some good cause for a big rise in Bodie. The lower levels I did not visit; understood that for the present they will not be freed from water, but larger forces placed in the upper works where in several places good ore can be taken in large quantities. Many of the miners were taken from the old Lent Shaft and employed in this bonanza portion of the mine. The ore is now being brought to the surface.

The Snow Track

Is being broken to the mill, and the sacked ore hauled and milled—not apparently for any sensation, but for a regular output of the milling ore—which, to all appearance, is ample for the 10-stamp mill for many years to come.

These 10 stamps have been doing something previously along—as I noticed on the 28th of January, when in their assay office 3 bars Bodie mine bullion, worth \$2.55 per oz., or \$10,654.55; of this value \$5,371.25 was gold.

MR. JOHN HAYS HAMMOND, M. E., of this city, is just now in the central portion of the State of Cal., in the U. S. of Colombia, where he has gone to examine some mines. He will, early in March, be in this city, en route East.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

SUTTER CREEK.—*Cor. Amador Sentinel*, Feb. 13: The mining outlook is very favorable here now. Mr. James Morgan has been in town for the past few days trying to buy the liens on the Mahoney mine for 50 cents on the dollar. I understand that he has met with great success and that he has got almost all the men to accept with the exception of a few; so things look as if we will hear the sound of the whistle before another week rolls by. We are under the impression that if Mr. Morgan gets the place he will be able to make a good paying mine out of the Mahoney. The Lincoln hoisting works are finished and the shaft is all timbered and the cleaning of the shaft out will be completed by the middle of the week, when they will start the mine in full blast. The fitting up of the Lincoln mill is in progress now. It will need considerable overhauling and repairing. The Iowa Mining Co. are making some very extensive improvements on their mining claim and they will be running in full blast in about two weeks, and the sound of the little pick will turn out the precious metal under the able management of Supt. John Tucker, who has been connected with the mine for the past few years.

SOUTH SPRING HILL.—*Amador Ledger*, Feb. 16: The first cleanup of the Talisman mill, running on rock from this mine, was made on the 24th of January, and exceeded the most sanguine expectations. About 250 tons were crushed, and the yield averaged \$30 a ton in free gold, without sulphurets. The gold bar was shipped direct to the owners in Boston. The mill is still running, but will probably have to shut down temporarily, as the supply of wood is not sufficient to enable it to run through the winter. The mine is looking splendid; indeed, everything indicates that it will prove one of the foremost mines of the county. There is plenty of rock, enough to keep a mill of double the capacity of the Talisman constantly at work. The ledge has been followed 100 ft., varying from two to eight ft. in thickness. It is a noteworthy fact that the ore-body runs in a south-easterly direction—right into the heart of the company's ground, as the shaft is located at the northern extremity of the South Spring Hill claim. Another favorable indication is, that the stringers of quartz seem to go down, creating the impression that the ore chimney has been struck at its apex, and that all the quartz veins will form a junction at a greater depth. The mine is not in a position at present to be worked to advantage as a gold producer. A second shaft is a necessity for convenience as well as safety. Located southeast of the present shaft, it would enable the rock to be run direct to the mill, doing away with hauling.

MISCELLANEOUS.—J. B. Pine has made a promising strike on the north fork of the Mokelumne river, toward the head of the Amador canal. At a depth of 60 ft. he has met with a ledge 10 inches wide, and widening as it is followed deeper. The rock will pay all of \$120 dollars per ton. Jeff Boxall, one day last week, picked up in a small gulch near Jackson a chunk of gold worth \$6.

SUTTER CREEK.—*Amador Dispatch*, Feb. 16: The future business prospects of our sister town of Sutter creek are much brighter now than they have been for some time past, owing to a revival of the mining interests in that vicinity. Work has already been resumed at the Lincoln mine, and satisfactory arrangements have been made by which operations will also be resumed on the Mahoney and Wildman mines in a few days. The shutting down of these mines has made business quite dull in that place for several months past.

El Dorado.

THE INDEPENDENCE MINE.—*Mountain-Democrat*, Feb. 16: A. A. Gignac has been down from Grizzly Flat the past week, and reports a rich strike in the Independence mine, near Brownsville. If the statements made by Gignac are correct, and we believe they are, the mine is looking far better than we had expected it would at this time.

Los Angeles.

SOMETHING ABOUT OUR PLACERS.—*Los Angeles Herald*, Feb. 16: It has been several years since the output of placer mines has been so satisfactory as at present. Placer flake, scale and shot gold is being sent to the city very often from various auriferous canyons, to our merchants and bankers, who buy it and send it to the mint in San Francisco. In some of the canyons land-slides, which have occurred during the heavy mountain rains, have developed rich pay dirt where it had never been prospected before. These new discoveries are not only rich, but are easily worked, and the gold brings \$18 an ounce. The Placerito canyon sends in a good deal of gold, being one of the oldest and best prospected canyons which has not been entirely worked out, and appears to be as profitable as ever, especially in wet season. The Piru, the canyon where gold was first discovered in the State in 1843, is still profitable and also contains gold quartz ledges, which are worked by arastras, propelled by both horse and sand power. The San Francisco canyon, which is very lengthy and extensive, although large quantities of gold are being constantly taken out of it. The reason is that the Tehachapi stage road has always run through it, up to Turner's Pass, making it so accessible that it was worked out more rapidly. There is plenty of water this year in the immense Sierra Pelon valley, north of Mt. Parkinson, and south of the Sierra Pelon range, although no reports have yet been received from there this season. There are quite a number of prospectors and miners there at work, however. By a trail over the mountains south, Lang is the nearest station on the railway, but by team, Alpine is the nearest. There is a good deal of gold obtained from the San Gabriel canyon, both by sluicing and the hydraulic process. There is also gold and silver quartz in the canyon, which are not worked at present. For about three years past there has been a yearly output of about \$100,000 taken out from our auriferous sand, and yet they seem as profitable as ever. The output this season, which is so favorable, will likely reach \$150,000 or more.

GOOD CHANCE FOR PLACER MINING.—*Los Angeles Miner*, Feb. 16: The heavy rains and cloud-bursts in the mountains have stirred up the prospec-

tors, as it is reported that the washes have disclosed the "color" in a number of canyons. A party, well equipped, left for San Gabriel canyon yesterday, and others will shortly follow. Numerous rumors have reached the city of rich finds, but none have as yet been confirmed. It is certain that this will be one of the best seasons for placer mining in the history of Southern California, owing to the abundant supply of water.

Nevada.

DITCH BROKEN.—*Foothill Tidings*, Feb. 12: The Idaho company received word yesterday that the South Yuba Company's ditch had broken a few miles below Quaker Hill, and that it would be several days before repairs could be made. Messrs. Coleman inform us that the break in the ditch will not cause any delay in the work of the Idaho, but will necessitate the use of steam in some places about the works. There is water enough in the Idaho Company's reservoir to last for several days yet.

LACK OF WATER.—*Nevada Transcript*, Feb. 16: The South Yuba Company less than two weeks ago were able to obtain about 10,000 inches of water from the river, but owing to the cold weather that source of supply is now cut off and they are compelled to draw from Fordyce. There is not more than fifteen ft. in the lake, and the ditches and flumes are so choked with ice that it is almost impossible to get enough down to this point to furnish the quartz mine here with power. A few days of moderate weather will make everything all right again; but it is something unusual for the company to be compelled to tap the main lake for water at this time of year.

Placer.

RICH GRAVEL STRIKE.—*Foothill Tidings*, Feb. 12: A company who are mining at Alta station, on the line of the Central Pacific Railroad, have made a rich strike in the bottom of their shaft. At the point where the parties are mining several channels are supposed to come together. The shaft is 195 ft deep, and the quartz gravel from the bottom of the shaft pays \$3 to the bucket-full. The gravel is 13 ft high and 30 ft wide. Immense wealth, it is supposed, will be taken from this bed. The Supt. of the Alta mine, at Virginia city, is the principal owner in this.

TWO OPHIR MINES.—*Placer Argus*, Feb. 10: Mr. R. B. Symington, formerly of Ophir, was there last week arranging about the sinking of the Good Friday shaft. A start has been made and work will be carried on till a depth of 220 ft is reached or 50 ft more than the present workings. Large sums have been taken from this claim (more than \$100,000) and yet very little work has been done; no explorations have been made further than 200 ft westerly from the shaft. The mine was located for copper and when gold quartz was discovered by another party tedious litigation ensued and prevented the development of the claim. Both these titles are vested in the present owners and three-fourths of the mine belongs to Messrs. Spring, Ferguson and Handy, who are now working in the shaft. There is a 32-foot overshot water wheel and an eight inch pump by which the shaft can be sunk 500 ft if desired. At that depth it is expected that the series of parallel ledges pitching at various angles will have converged and formed one main ledge. The gold is free-milling and coarse, and has hitherto been found in pockets, but these pockets have been numerous, and in Tuolumne county and elsewhere it has been proved that this class of veins may be very profitable and systematically worked. Messrs. Symington and Ferguson are also interested in a mine of a very different character near Ophir. This is the Kirkland claim lying south of the village. Many trials have been made on this ledge which is one of the largest and most highly mineralized in the county. The mistake hitherto has been in treating the ore by the ordinary free-milling gold process, there being no other kind of mills in the district, while the ore contains carbonate of silver and gold bearing sulphurets, all of which were lost. Notwithstanding this Wm. Buttes manages to make the rock pay in a small way with a very primitive five stamp mill erected on an extension of the Kirkland claim. Mr. Symington proposes to open this claim by sinking a shaft 100 ft and running a level 300 ft along the ledge and expects that this will so expose the valuable character of the ore as to induce parties of sufficient capital to join him in erecting works suitable for its treatment.

Plumas.

SPLENDID QUARTZ.—*Plumas National*, Feb. 19: A splendid specimen of quartz from See & Jolly's Splendid Specimen in Granite Basin, has been added to our cabinet this week. It shows free gold in hundreds of places, and besides is filled with fine-looking sulphurets. The boys have a nice little property down there, and go steadily along, making it pay all the time. The specimen is from a portion of the ledge just opened, and said to be richer and better than any heretofore developed. We have never lost faith in Granite Basin, and confidently expect to see it one of the very best mining districts in the mountains at no distant day.

HALLSTED LEDGE.—*From Mr. A. D. Hallsted*, who came up from the East Branch on Sunday, we learn that the tunnel is progressing steadily on their ledge, and the vein shows large and in good shape. Where the tunnel cut the ledge it proved hard, but only for a few ft, and as the drift progresses on the vein it shows softer and prospects first rate. It was eight ft across it when the tunnel tapped it, but no crosscut has been run since the drift started. The side drift is now about 30 ft in length, and will be continued for some distance. The owners are highly pleased with the showing and feel confident that the Hallsted mine will prove everything that was expected of it.

San Bernardino.

AROUND CALICO.—*Cor. Los Angeles Herald*, Feb. 14: The reports from all the mines now being worked in and around Calico, are most promising. Also from the Lava Beds I hear reports of rich strikes. The troubles in connection with the Alford mine, near Camp Cady, I hear are about to be amicably settled, when work will be resumed at that place. At Ord but little is being done just now, but I believe that work will be started up on some of the mines in a few days, or as soon as the weather is sufficiently settled to get supplies in. It is now currently reported here, and on good authority, that Col. Olmstead, from Colorado, is about to establish sampling works at his place. He has secured a lot at the east end of town, near the railroad track, where he will locate his business. This is a good move in the right direction, and one in which every

one in this section takes a deep interest. It will be a great benefit to this whole section of country, and if properly constructed, will build up a large business in the near future that will not only be very profitable to the promoters, but the mine owners as well, as it will give us a home market for all base ores, that are comparatively valueless. Yesterday we had a sunshiny day, but to-day (Sunday), the 10th, it is raining again, with every prospect of an extended storm.

MINING IMPROVEMENTS.—*Grass Valley Union*, The Nevada Gold and Silver Mining Company are negotiating for heavy machinery to work their mine at Ophir Hill. The company have also bounded the Peabody mine, and the Grass Valley Mining Company's claim on New York Hill, better known as the old Bobby Smith ground. Work is to be commenced on all these claims immediately. At an early day the company will also erect a 10-stamp mill, with all the modern improvements, a mill site having already been secured near Boston ravine.

Sierra.

COLUMBO MINE.—*Mountain Messenger*, Feb. 9: An important discovery was made in the Columbo mine a few days since. While the men were at work in the ledge, they cut through about a foot of bed-rock alongside the ledge, and discovered another about 11 ft wide, the rock from which prospects better than that of the original ledge. No one outside those interested, knows what the rock paid per ton for the first run, further than that it was more than \$12. The sulphurets are saved by a true concentrator, and their assay value is \$800 per ton. Several tons have already accumulated. These sulphurets will be shipped below for reduction. During the late run of the mill it was discovered that there was some lead in the ore, which interfered somewhat with the process of amalgamation. We presume, however, that it is not likely to interfere much with the saving of gold, as the quantity is not great in any rock yet worked in this section.

MARGUERITE MINE.—*Mountain Messenger*: The Marguerite quartz mine seems to be in trouble again. A few days ago a lot of wood was attached by a creditor at the city. The company is in debt to Jim Miller about \$1,600 for beef, and owes Sol Rousseau some \$3,000 for freight, etc. It is also behind some 20 months with the workmen. The cause of this backwardness no one seems to know, as the principal owners, Robinson and Humbert, are reputed to be wealthy. It is said that the property is covered by a mortgage for \$100,000. The company are still making improvements. They have a large turbine wheel at Truckee, which is to be put in place some distance below the mill, and the power conveyed to the mill by means of a wire rope, to run the hoisting works. This wheel is to be run by the same water that is used to drive the mill. The fall obtained is about 30 ft. They are sinking the shaft preparatory to crosscutting to the rich chimney worked in the levels above. It is expected that a tunnel will be started south in the spring to cut ledges known to lie in that direction. Louis Garibaldi is reported to have obtained a good prospect in gravel at the head of Coyoteville Ravine. The Buttes mill, No. 9, is expected to be ready to start 20 stamps about the first of March. About 200 ft of tunnel has been run on the rich ledge owned by Sunderbause and others, on Packer creek.

THE RUBY MINE.—*Sierra Tribune*, Feb. 16: Forty-six men are employed at the Ruby mine at present. Four breasts are opened out. The course of the main tunnel has been changed and is now being run towards the east rim-rock. A new gangway was started from the main tunnel last week. The channel has recently taken a turn toward the northeast. Sixty and one-quarter ounces of gold were cleaned up week before last. The scarcity of water has prevented a great amount of washing being done since gravel was found the last time. At the same time, Superintendent Coleman is getting everything in shape to increase the working force and wash on an extensive scale as water commences to flow more freely.

BALD MT. EXTENSION.—*Mountain Messenger*, Feb. 16: Last Saturday the Bald Mountain Extension Drift Mining Co. paid its first dividend, of two cents per share. The stock of the company is divided into sixty thousand shares, three thousand shares being an original interest. The company was organized in 1874, and has been steadily at work since 1878. This dividend, though small, is encouraging, although made from the south fork ground. The main tunnel is making satisfactory progress in the lava above Ruby channel, something over 300 ft being completed. The Company has temporarily reduced its force, owing to the fact that its dumps are all full, and there being no water to wash. The large dump now contains about 3,000 carloads. About half a force is still at work.

RUBY.—The Ruby Company has been obliged to "lay off" most of its men, owing to the extreme cold.

BUNKER HILL DRIFT MINE.—No work has been done in the Bunker Hill mine since about Christmas, owing to the freezing of the water used to force air into the workings. When water was suspended the gravel was richer than any they had had for a long time. The snow at the mine is about 11 ft deep, which insures the company plenty of water next season should no more fall. The Buttes Company have No. 9 tunnel in over 3,600 ft, and have put their men at work on the second twenty stamps for No. 9 mill. The contractors running the Grand Prize Co.'s tunnel have made 70 ft. The contractor on the Sunnyside tunnel is making good progress, the rock being moderately soft.

THE BALD MOUNTAIN MINE.—At the above named mine, about sixty men are employed at present. A larger force will be worked whenever an increase of water comes. About 21,000 carloads of gravel are stored in the two dumps. In addition to taking out the pillars in the main tunnel and Lowell avenue, new ground is being opened near the air-shaft. The storms have not as yet made any perceptible increase in the water supply, and consequently but little washing is done. However, about 100 ounces of gold are cleaned up per week.

WORK PROGRESSING.—At the Rainbow mine, a stone's throw below Alleghany, the work of pushing ahead the new tunnel is going rapidly ahead. Two Burleigh drills are kept constantly at work and the tunnel has already been run 600 ft. One hundred and seventy-four ft were run last month. The length of tunnel required to tap the ledge is 2,000 ft. At the present rate of progress, the entire distance will be

run in seven or eight months. The mill will not start up until that time.

BRANDY CITY.—The quartz ledge located some time ago John J. Williams has been thoroughly tested by two mining experts. An Eastern Company have become interested in the property and will erect a ten-stamp mill next spring and develop the mine on an extensive scale. The Brandy City M. Co. have made a short run, but owing to the scarcity of water had to suspend operations. The machinery for running the drain tunnel, which was hauled in over the rough roads by way of Grass Flat and Eureka, is in splendid order, running by water power and doing good work.

Siskiyou.

SAWYER'S BAR.—*Yreka Union*, Feb. 6: The scarcity of water has compelled a majority of the mining claims to remain idle, only two or three at present working to any advantage. The Klamath mill is cleaning up to-day, and those concerned are confident of good results. They will have to wait for milder weather before they can start the mill again. The Uncle Sam has no water. The snow is four ft deep at their mill, which assures them a good supply of water the coming spring and summer.

Trinity.

THE OUTLOOK.—*Trinity Co. Journal*, Feb. 16: The freezing weather which of late has dried up the water and prevented storm seems to have broken, and indications now point to the proverbial "spell of weather" which shall shower blessings on all the people. From 14 deg. Thursday morning, the thermometer rose to 34 deg. Friday morning, and the vain attempts at storming of the past two days have settled into a snow-storm of much promise. Water will soon be plenty and the stamping of quartz mills and groaning of arastras will keep time with the merry music of the hydraulic and the sluice. At the present moment the prospects for this section are much brighter than at any time for several years, and the close of the present season promises to advance Trinity far toward the head of the column of the gold producing counties of California.

FROZE UP.—Reports from Deadwood district say the freezing weather has stopped all the arastras in that section with the single exception of the one owned and run by John E. Gibson. This arastra is run with one of Davidson's Turbine Wheels which does splendid work and refuses to be interfered with by cold weather or other obstacles. Mr. Gibson is building a second arastra to be run by the same wheel, which will furnish sufficient power for both.

MINING OPERATIONS are suspended throughout the county on account of the severe cold and freezing weather which has almost stopped the flow of water. There is nothing in this, however, to discourage the miners, as they well know the supply of snow locked up in the ravines and mountains is sufficient to last long into the summer and they can well afford to wait until warmer weather releases it and fills the ditches with water for mining purposes.

NEVADA.

Washoe District

GOULD AND CURRY.—*Virginia Enterprise*, Feb. 16: The winze joint with Best and Belcher below the 2500 has about reached the 5700 level. The decomposed material has been passed through, and the bottom is now in birdseye porphyry. The winze is exceedingly hot, owing in part to the constant dripping in of hot water from the soft ground above. Not much water comes in through the birdseye porphyry. At the Bonner shaft the 1200 station has been reconstructed and made one-third larger than it originally was. The shaft is found to be in good condition to within 25 ft of the 1500 level. They are now drifting north from the 1200 station.

SIERRA NEVADA.—The upraise from the main north drift on the 2900 level has been connected with the 2700 level. The raise is now in good shape from bottom to top and will prove of great value, as by means of it all the ground above the 2900 level may be thoroughly ventilated and prospected. The northeast drift on the 3100 level is being pushed ahead and is showing streaks of quartz with some ore. As these streaks run about the same course as the drift not much that is new is likely to be developed until a crosscut is made.

UNION CON.—The connection has been made between the main north and south drifts on the 3100 level. It will now take about a week to grade down the northern portion of the drift, put in car track, etc. This connection gives a circulation of air that will thoroughly ventilate all the north end mines. From the great air gallery—which furnishes 20,000 cubic ft of fresh air per minute—a new departure in exploration may be taken.

OPHIR.—A considerable amount of ore is still being taken out of the 150 level, and a good deal of prospecting is being done. On the level one drift is being run north, and two are being run west. By means of these the ground at that depth will be pretty thoroughly explored.

ALTA.—The east drift on the 2150 level is in a kind of quartz that breaks badly in blasting, as it blows out in pot holes. This quartz gives low assays. The west drift is in ground that works very well and shows stringers of quartz that carry some metal. It is now out 1,500 ft.

COMBINATION SHAFT.—The shaft is now down a little over 2,750 ft. It is going down in very favorable ground. At the 2800 level a station will be opened and a drift started west, but the shaft will not stop at that point; it will be pushed on down to the 3000 level. The two hydraulic pumps, and all the pumping apparatus and machinery, are working well and smoothly.

BEST AND BELCHER.—The joint Gould and Curry winze below the 2500 is now about down to the 2700 level. It has passed through the soft, decomposed material, and is now in birdseye porphyry.

HALE AND NORCROSS.—Are still sinking the winze below the 3800 level. It has already attained a depth that will give all the sump room that will ever be required, and the work of cutting out a station at the 2800 level will doubtless be commenced in a day or two.

IMPERIAL.—The drift from the 600 station is now probably in the old ground to the west. It is out about 600 ft and has passed through over 100 ft of quartz and quartz mixed with porphyry. Already it

is seen that in this section is a promising field for exploration in this mine, the Exchequer and Alpha.

UTAH.—The northeast drift on the 1750 level is making the usual rapid progress, and is now 270 ft. It is still in quartz of promising appearance, which still carries some metal.

SAVAGE.—The north drift on the 2600 level is being advanced as rapidly as possible. It is in vein material of a very promising appearance. When sufficient nothing has been obtained crosscuts will be run from this drift.

YELLOW JACKET.—Not much work can be done in this mine at present, as the ore cannot be reduced, owing to the freezing up of the mills on the Carson river. As soon as the mill wheels thaw out, all will again go on as usual.

BELCHER.—Owing to the freezing up of the mills on the Carson river, work at the mine has been discontinued, and the miners laid off. As soon as the mill wheels thaw out all will go on as usual.

CALIFORNIA.—Joint Consolidated Virginia winze No. 2 has reached the 2000 level, and a station is being cut out preparatory to drifting to connect with the main south lateral drift of the level.

CONSOLIDATED VIRGINIA.—Joint California winze No. 2 has reached the 2000 level, and a station is being excavated from which to drift out and connect with the main south lateral drift of the level.

Bernice District.

PROMISING.—Cor. *Silver State*, Feb. 12: The mines have never, in the history of the county, promised so much as at present. Of Bernice district, which is nearer your town than to our own by the most accessible route, your correspondent can speak only from hearsay. Parties in from there, however, report everything progressing finely. The mill—ten-stamp—has started up lately on ore from Goodell & Williams, and from Healey's and Hoyt's claims, with a prospect of running steadily for some months. It is conceded by all who have visited the camp, that it will make one of the most reliable little towns in the State. Wood and water are in abundance, and the leads are well-defined and of good grade. This camp alone will probably double our population in the next twelve months.

Bristol District.

DULL.—White Pine *News*, Feb. 9: At Bristol it is very dull, though the Day Co. are getting ready for a long and, I believe, successful run. Richard Walsh is their foreman. They are taking out large quantities of ore from the Day mine. The Mendham mine, owned by the same company, 20 miles from Bristol, is also turning out some rich ore.

Columbus District.

COLUMBUS CON.—*True Fissure*, Feb. 16: The drift from the bottom of the Bonanza winze has reached a length of about 128 ft. This drift is running to connect with the shaft on the third level, and there remains about 19 ft of a drift yet to be run before the above mentioned connection can be arrived at. The main shaft has attained a depth of about 105 ft below the station of the third level, making a total depth of about 355 ft. The work of cutting out the fourth level station is now under way.

GREAT EASTERN.—In running a crosscut to the west, 200 ft from the mouth of the tunnel, a body of ore from two to three ft in width was encountered. It has steadily improved in appearance since first struck and continues to look very promising. There are now some five or six tons of ore on the dump, and the arrangements are being rapidly completed for taking out the ore with better facilities. This property was formerly called the Schiller and was relocated by T. J. Harrington, W. H. Elliott and P. Manning, who are the present owners.

BAZAN.—Work is being prosecuted on this mine by W. H. Kent and E. Gifford, under a lease from the owners. Some very good ore is being extracted and the ore body is of a very fair size. A carload was shipped by rail on Sunday last, from which good results are anticipated. The Bazan and Sultan claims are adjoining and a joint shaft has been sunk on the line to enable the working of either as may be desired. Good ore has been obtained in both, either of which is a paying proposition for a small number of men working as partners.

LUCKY HILL.—T. J. Harrington, John Casey and J. Murphy have taken the contract for extending the south crosscut a distance of 50 ft. Fair progress is being made and with very satisfactory results, though the ground in the face of the crosscut is quite hard.

Cortez District.

CORTEZ MINE.—Reese River *Reveille*, Feb. 14: Very little is known or heard of the Cortez mining district, though we doubt if many mines yield more bullion than the Cortez mine, which is owned by one man. It is worked by means of a tunnel and 40 men are now employed. Since January 1st we learn that 20 bars of bullion, weighing 100 pounds each, have been shipped from this mine. Here is nearly two tons of silver produced in about six weeks by a mine whose name is hardly known to many of the public, though it is only a day's ride from Austin.

Paradise District.

THE PARADISE MINES.—*Silver State*, Feb. 12: A note from Supt. McCurdy, of the Paradise valley mine, says they have had a heavy storm in Spring City, but manage to keep running. The mines continue to look well, and there is a very encouraging improvement in the upraise from tunnel No. 4, or lower tunnel in the Paradise valley mine. They shipped, notwithstanding bad weather and the many drawbacks incident thereto, \$20,400 in January, and they expect to do as well or better this month.

Patterson District.

NOT OVER-ESTIMATED.—White Pine *News*, Feb. 9: I have been over to Patterson, the new mines discovered by Hamilton parties, and I can assure you their merits are not over-estimated. The rock in that section is very hard, but the ore is very rich and will pay from the surface down.

Pioche District.

ALMOST DESERTEO.—Cor. *White Pine News*, Feb. 9: I went on to Pioche. What a change in that once prosperous town! Empty houses, one-bit whiskey, nothing doing in her mines, and the once busy town almost deserted.

Reveille District.

THE WORK OF FOUR MINERS.—Cor. *Eureka Sentinel*, Feb. 16: It was not until October 18,

1872, that the Gila was located by Barnes and Clarke, who subsequently took Messrs. English and McGee into partnership with them. These gentlemen then purchased the old mill brought here by Lambert and Mason, putting it in thorough repair, which, during the first month's run, after having been changed to a dry-crushing mill, turned out a little over \$72,000. Now, this is seldom beaten by a ten stamper. Gov. Adams has not done the least thing toward starting leaching works. The cretion and successful running of the leaching works here were done by a few hard working miners, who leased the Gila dump and the old workings of the mine from Gov. Adams for one year. The names of these worthy four are Bianche, O'Malley, Ennor and Byron, and to them, and them alone, belong the honor and, I trust, the profit of erecting the first leaching works in this old camp. They deserve greater honor from the fact of putting this thing through in mid-winter. No frosts nor any other discouragements retarded their work. Soon the output of bullion will be steady and uniform, as the supply of raw material is practically and inexhaustible in this district. They will remove all the waste in the different drifts and stopes of the mine during the bad weather this winter, reserving the dump for next summer. Very soon they will have three tanks in full operation, which will insure them good profit from ten tons daily. In no other way could the fine dirt in and about this mine be treated successfully, as it would not pay to ship to the mill, distant ten miles, and treated with pan process, as the loss of quicksilver and freight would absorb it all. These men have just shipped by Mr. Norris, 24 sacks of gold No. 1, to be sold to a smelter in Salt Lake. This is the forerunner of much that will follow if the returns are satisfactory as compared with Eureka smelters, which only pay 67 per cent on high or low grade ores, while they actually get from \$30 to \$60 per ton for smelting all the ores from this district. Sixty-seven is probably all they can afford on Eureka ores, but not near enough on high grade ores.

Silver King District.

ORE.—White Pine *News*, Feb. 9: Fifteen miles south of Patterson, John Wheatley and two others are at work on what is known as the Hughes mines, Silver King district. They are down on two of their mines over 100 ft, and 50 to 60 ft on the others. They have developed a body of ore in one of these mines that assays from \$60 to \$100, and goes from 25 to 40 per cent in lead. Jack Wheatley claims it is the biggest body of ore in Lincoln county. Wood and water are adjacent in abundance.

Taylor District.

FULL CREW.—White Pine *News*, Feb. 9: This is quite a live camp as compared with Bristol and Pioche. The Argus Co. is working a full crew of men, and the Monitor people are prospecting with good results. They are down over 200 ft, and have good ore at that depth. The Argus mine never looked better than at present. But, notwithstanding our favorable mining prospects, business is very dull on the outside.

ARIZONA.

WEST SIDE.—Tombstone *Epitaph*, Feb. 12: During the week just passed connection has been made on the 400 level, this level now being open from shaft No. 1 to shaft No. 3, a distance of 1,000 ft. Stopping is now being done on this level for this entire distance. A large body of ore has been developed on the fifth level, part of which is in hitherto unworked ground. The ore body is at present developed for a distance of 85 ft, the development work still being in ore, and its extent is yet unknown. The company's mill and furnace at Charleston are running steadily, with good results. The furnace shipped 100 tons of bullion last month.

CONTENTION moves steadily on at its accustomed rate, producing its regular daily output of ore. The ore bins are kept well filled and the mill is constantly supplied with all the ore it can treat. The ore is of its usual good quality, and the bullion yield is satisfactory, indeed. The pumps are running steadily and smoothly, keeping the shaft dry at five strokes per minute. These pumps throw 80 gallons of water to the stroke, making 400 gallons to the minute, or 576,000 gallons in 24 hours.

GRAND CENTRAL is moving on its usual even tenor, and producing its daily output of 85 tons. The mill is doing excellent work and the product of bullion for the week was large. The pumps are at work steadily, and have nearly overcome the water, there now being only about six ft of water in the shaft. The stopes on the various levels are looking remarkably well, and it is estimated there is ore enough in sight in this mine to keep the mill running steadily for more than two years to come.

PROMPTER is still pushing developments on the 100 and 200 levels, and will make connection on the 200 level with the winze which was sunk in an ore body from the 100 level.

LUCK SURE.—During the past week prospecting in different places throughout the old workings has resulted in the discovery of what, with present developments, seems to be a body of high grade carbonate ore. This is in the bottom of the old workings; while 50 ft from the surface, and 50 ft north from the shaft, a large body of manganese ore has been uncovered, which shows indications of being connected with larger bodies to the north, and entirely distinct from any of the ore bodies found in the old workings. Several other places have been opened in which indications are good, and stringers of ore are found which promise to lead to other bodies similar to those which were worked out a few months ago. In this formation pockets and bodies of ore are liable to be found at any point, and it requires very careful work and thorough development of every portion of the ground.

LUCKY CUSS is still working three shafts, and producing a considerable quantity of manganese ore. During the past week some very high grade ore has been taken out.

EMPIRE is running along smoothly, hoisting a considerable quantity of ore, some of which is very high grade, and is put in sacks as it is taken down and piled up in the hoist when brought to the surface.

THE NEW BONANZA.—Tucson *Citizen*, Feb. 16: The Bonanza mines continue to attract attention from all parts of the country, and despite the repeated warnings of the press and the Superintendent of the mines, prospectors and laborers continue to

come by the tens and by the hundreds. Mr. Brook, who is about issuing a newspaper in Logan City, and came up from the mines this week, informed the writer that the principal street of Logan and New Virginia City is nearly a mile long, and that from appearances he is of the impression there are a thousand people on ground. The houses are of every known species of the inventive Yankee mind, supplemented by what has been learned from the Mexicans and Indians. There are a number of good frame houses about completed, and many others in course of construction. Then comes the canvas house, which is constructed of duck stretched over a frame of Oregon pine. A few have made preparations to build adobe houses; shanty houses, wickiups, tents and flies are to be seen in every direction, and anything that will protect the new comer from the storm and sun seems to be acceptable. There is no use of telling laboring men and miners to stay away from the Quijotoas; the tide has turned strong in that direction, and, as everybody knows, miners and prospectors, when once convinced that a new camp is about to build up will go and see for themselves, trusting to Providence for success, and if they fail they are ready to pick up their blankets and walk away. But the settlers of Logan and New Virginia City are not all laboring men and miners. Men with money are already on the ground. Grocery stores, hardware stores, provisions, clothing, liquor, news stands, in fact, every species of wares that can be thought of or used in a mining camp are to be found there in quantities. The road is lined with heavily-loaded freight teams conveying supplies of all kinds to the new El Dorado; from 10,000 to 15,000 ft of lumber arrives daily, which is bought up by the hungry builders as fast as it can be unloaded from the wagons. If this continues for any length of time the new city at the base of Mt. Ben Nevis will rival the older towns of the Territory in population. Work on the artesian well at Logan continues and is being pushed as fast as possible. The number of men at work on the mines has not been increased and cannot be to any great extent for some time to come. Prospecting in the adjacent hills and mountains is active and many good prospects have been found. This great rush to the Quijotoa mines is premature, but it will result in a thorough prospecting of all that region of country extending south into Mexico. The fever is raging and in spite of all that may be said and done to prevent it will run its course.

COLORADO.

EMPIRE NOTES.—Georgetown *Courier*, Feb. 16: The City of Empire lode, owned by W. H. Moore, has, (one half of it), been leased by Geo. W. Barrett and work commenced. Considerable ore is now being taken out. The Cashier, Coin, Mint, and a few other lodes have been leased and bonded to Wisdom & Co., of Chicago, who are diligently pushing work ahead. The old Bay State mill which was reported last week as running 12 stamps, has shut down permanently, on account of the leakage in the batteries, and more gold was lost than saved. Mr. Niemann says he is out \$1,000 in repairs, and now he finds that the sill underneath the batteries is rotten the whole length, and he don't propose to expend any more on old mills.

MILLED.—Twenty-one tons of 730 ore was milled from the 1st to the 9th, the average net value of which was \$380 per ton. This mine was a good producer in early days, when the ore was taken from near the surface, and now, at 300 ft, produces more than ever, and the grade of the ore is as good as that found near the surface. Much of the ore taken out during the past month milled from 700 to 800 ounces per ton, and during the month of January about 100 tons of ore was milled.

MILL RUNS.—The following are a few of the mill-runs that have been made during the past week: Six tons of Magnet ore milled 200 ounces silver per ton. A mill run of three tons of ore from Lebanon tunnel, returned 190 ounces per ton. Eight tons from the Boyd returned a 113 ounces per ton, and a high per cent in lead. Three and one-half tons of the Corry City ore milled 119 ounces per ton. Two lots of ore from the Equator averaged 100 ounces per ton. Four lots from the Stevens milled 145 ounces silver per ton, and 50 per cent lead. Two lots of Mammoth ore, nearly six tons, averaged 70 ounces per ton. Three tons of Pelican ore returned 154 ounces per ton. A mill-run of a lot of Vulcan ore returned 300 ounces silver per ton. The Stephens Concentrating Works, at Lawson, is running steadily, and plenty of ore in the mill. The Miners' Sampling Works will soon open up. Mr. Billings intends buying all kinds of ores in lots of any size. Work on the Mammoth lode on Sherman mountain, is being prosecuted by a force of lessees, who are extracting an average good quality of ore. In the lowest level of the Pay Rock, Proutt and party recently struck a streak of high-grade ore eight inches in width. This streak had heretofore been considered the wall, but when they broke into it, to their delight they found it to be entirely different from what they supposed it to be. The lessees on the Tishomingo, on Sherman mountain, near the Mendota, owned by Messrs. Old and Guanella, of Georgetown, have a streak of ore carrying gray copper and running high in lead. Although but little development has so far been done on the property, its prospects are said to be flattering. A lease on the Tishomingo, an extension of the Mendota, was let last Tuesday to a party of six who intend putting up a building and supplying machinery to sink the shaft. From four to fourteen inches of ore is shown up and down the shaft, which will run from 50 to 150 ounces in silver per ton, and from 50 to 60 per cent in lead.

IDAHO.

NEW PLACERS.—Walla Walla *Statesman*: It is reported that rich new placers have been struck 45 miles northeast of Pritchard creek, which would place the new digging in Montana at the base of the Cabinet mountains and 15 miles east of the Northern Pacific. The report, like a great many other rumors about the extent of the Coeur d'Alene, is very probably false. The summit of the Coeur d'Alene range, where Pritchard creek has its source, is the dividing line between Idaho and Montana. Eagle city, in the forks of Pritchard and Eagle creeks, is not more than 18 miles from the Montana line, and no prospects have been found on the Montana side up to date. Our readers will do well to take all these alleged reports of rich strikes in the camp with a pretty big piece of salt. It is impossible that prospecting can be carried on at this season. The altitude of the country forbids it. The snow is too deep and the

weather too severe, and the very nature of the country, broken as it is and densely timbered, gives the lie to these reports of rich new strikes in the dead of winter. On Pritchard creek big pay is realized in a few places, and enough has been taken out not only to prove that the gold is there, but to encourage capital to take hold and open the deeper portions of the creek. For it must be remembered that the creeks in their length are deep and comparatively flat, which will increase the cost and labor of extracting the gold. Whether gold exists on Eagle creek above the forks nobody knows, for nobody has prospected. With half a dozen exceptions the entire camp is located in 20 acre tracts on the suspicion that the ground contains gold. All that we positively know is that big pay has been taken out of a few claims on Pritchard creek, and that rich gravel has been found above the rim rock, from which it is safe to presume that there is also gold along the entire lengths of the creeks. It is also a likely country for quartz, and enough prospects have been discovered in quartz to justify us in classing the country as a mineral belt. It is about the likeliest country to prospect in that remains unexplored in the United States, but nothing has been discovered up to date to justify a stampede. Snow lays there until May 1st, and until snow goes the prospector can do nothing. Those who go in now are liable to see hard times unless they are well provided with ducats, for flour is \$65 per barrel and bacon 60 cents per pound. Freight from Rathdrum to Eagle city, a distance of 82 miles, is 25 cents per pound.

COEUR D'ALENE.—Private letter Ketchum *Key-stone*, Feb. 16: I am asked for my opinion of this country, but hardly know what to say as I have seen little by actual experience. I reached here to late in the fall to do much prospecting. I visited some of the best claims, and when they were cleaning bedrock saw plenty of gold in the unwashed dirt. But very few of the claims have been opened up and none of them have found bedrock; nothing but rim-rock. I think there is no doubt of some very rich ground here but it will cost stacks of money to get it out, because the country is flat, bedrock very deep, and the gold mostly on bedrock. The country is, however, a good deal like Wood river, for if one claim in a few pays it will be a very rich country. The gold belt seems to be extensive, but one great drawback is dense timber everywhere. As yet, there is very little known about quartz. It is not yet settled as to the probable best route here next spring. One company will try and navigate the Coeur d'Alene river, and another to bring in a trail from the nearest N. P. point, named Bellnap. Other trails projected, one called Jackass Prairie trail and Evolution trail. I think Trout creek trail will be the best. It is the hardest country to get to, for the distance, I ever saw. One is compelled to alternate between high mountains and swamps.

UTAH.

REVIEW.—Salt Lake *Tribune*, Feb. 16: The movement of bullion for the week is again light, the cold weather and storms materially interfering. The receipts of bullion in this city for the week ending February 13th, inclusive, were \$77,640.92; of ore, \$2,850; of both, \$80,490.90. The shipments from this city for the week ending February 9th, were 1,825.022 pounds. Of the total receipts of bullion, seventeen cars, valued at \$51,000, were from the Horn Silver, bringing the shipments of this company for the year up to \$243,000. The Ontario shipped for the week, 24 bars of Ontario, \$26,640.92, bringing its total up to \$180,597.98 for this year, to date. There is no report from the Hanaucr smelter for the week, and McCormick & Co. report but one receipt, that of one lot of Crescent ore, \$2,850.

ANOTHER VEIN.—The Salt Lake *Tribune* has been interviewing John Knapp, who has just got back from Coeur d'Alene. He first went to San Francisco and then up to Portland, and thence to Spokane Falls. Leaving Spokane Falls, Mr. Knapp journeyed along the Northern Pacific eastward until he reached Trout Creek station. Alighting from the cars there on January 23d, he started on the Trout creek trail for Eagle City, the only possible route at present available. Although it is only about 37 miles from Trout creek station to Eagle City, it took Mr. Knapp three days to make the journey, reaching Eagle City on the 26th. Horses were able to get in about 18 miles on this trail, but could not possibly make any further progress. The trail was lined with toboggans, from Trout creek to Eagle City, all bearing provisions and tools. These toboggans are simply long, rude sleds, and the burden some of them are forced to carry is simply marvelous. Frequently when climbing a steep ascent, the party pulling the sled will have to unload his toboggan and haul his merchandise up in sections. No wagons can possibly come along this trail, and parties coming in on horses are forced to leave them at a point at least twenty miles from Eagle City. The walking is the roughest imaginable—up and down peaks, over the backbone of the highest mountains, and the trail filled with rocks and boulders. Another road is now being constructed to Eagle City from a station called Belknap, on the Northern Pacific, east of Trout creek station. Twelve miles of this road were completed on Sunday last, and sixteen more are still to be constructed. This road will be wide enough for wagons to travel over, and will be ready for travel by March 1st. Mr. Knapp, after reaching Eagle City, remained there till February 1st, and made close observations of matters and things in general. Eagle City lies at the junction of Eagle and Pritchard creeks; and the main street of the town, which is sixty-five feet wide, is merely a continuation of the Trout creek trail. There are about twenty log houses with stake roofs on this street, and a few houses on the side streets. There are two restaurants—the Pioneer and the Nevada—and the bill of fare at the former, as copied by Mr. Knapp in his note-book, is as follows: Onions, beans, sowbely, rice, coffee, biscuit. For such a meal the modest sum of \$1 is charged, and three solid meals of that character a day cost \$3; by the week the board of course is cheaper, although the bill of fare never changes. A bunk is worth 50 cents, and the party using it is compelled to furnish his own blankets. Many men sleep on the snow; and on the trail from Trout creek station, men have established relay spots where camp fires are built at night, and the men throw their blankets on the snow, and sleep the sleep of the tired and weary.

Appeal of the Debris Case.

When it was stated last week that the defendants in the case of Woodruff vs. The North Bloomfield Mining Co. had "vacated" the appeal—that is, had withdrawn it—it was a matter of surprise to many, as it was the general impression that the case would be appealed. And this is the fact, and the proceeding referred to was only a matter of form; for a proper appeal will be made in due course of time, providing the mining community sees fit to furnish the necessary funds for the contest. And this very important point must be determined shortly, for without funds the appeal cannot be made. The shutting down of the hydraulic mines has stopped revenue from that source, and many of the miners who have been carrying on the legal fight can do so no longer. The lawyers for the miners have given an opinion on the subject of the proposed appeal to the Miners' Association, which is as follows:

If the defendants in the case of Woodruff vs. North Bloomfield et al., desire to appeal and stay execution for costs, it will be necessary to take an appeal and give a bond within sixty days from the 23d of January, 1884 (the day of entry of judgment). The judgment for costs will be about \$3,100.

As to the propriety of taking an appeal, we have to say that we think there are sufficient errors presented by the record to warrant a reversal of the judgment.

We think the court erred in overruling the demurrer for misjoinder of parties defendant. We also think it was error to give any judgment on the merits against the defendants. It was certainly erroneous to give judgment beyond the allegations of the complaint.

The complaint charges that the alleged evils are produced by hydraulic mining only; whereas the injunction prohibits all mining by the defendants; or even allowing their water supply to be used by others for mining purposes.

We also think that the court was mistaken in holding that restraining dams are impracticable.

If an appeal be taken to the Supreme Court of the United States, there will be a trial, *de novo*, on the evidence.

We advise an appeal, believing that the Supreme Court will reverse the judgment, or so modify it that mining may continue.

This opinion is being sent by the Miners' Association to quartz, drift and hydraulic mines in this State, with the following circular:

OFFICE MINERS' ASSOCIATION,
320 SANSOME ST., ROOM 23,
SAN FRANCISCO, Feb. 20, 1884.

DEAR SIR:—Enclosed please find copy of the opinion of our counsel, as to the propriety of appealing the Woodruff vs. North Bloomfield case to the Supreme Court of the United States.

After a careful perusal and consideration, we would like to have your views as to the policy of following the advice of our counsel.

The judgment of the Court is broad enough to include not only hydraulic mining, but all other classes of mining in the State.

To appeal the case, with the vast quantity of testimony and exhibits which involves its trial *de novo* in Washington, will cost considerable money, and the few who have up to this time contributed to the expenses of litigation, are unwilling, and some of them unable, to bear the further large expense of an appeal.

The order entered on the records of the Circuit Court, when the opinion was delivered, allowing an appeal, was premature, and entered by a mistake of the clerk, and has been vacated, on our motion, in order that a valid appeal may be taken, if finally so determined.

The effect of the vacation of the order granting an appeal, simply places the defendants in the same position they held on the entering of the decree, and does not prejudice their right of appeal within the limited time of two years.

Before taking further steps to appeal, we desire your views, as a member of this association, or as otherwise interested in the business of mining, or any interest dependent upon mining, as to whether you deem such appeal advisable; and if so, a further statement of what your company, or you individually, or your local community, will contribute to the expenses of an appeal in this case.

We further suggest that you submit this matter to your neighbors, that they may, as far as practicable, act in concert.

THE MINERS' ASSOCIATION,
By its Board of Council.
L. L. ROBINSON, President.
W. A. SKIDMORE, Secretary.

OLD FORTY-NINE TIMES.—Since Sawyer swears no mines shall be worked by the hydraulic process, about a dozen men are at work on the old '49 plan in the Milton Mining Company's ground at French Corral. They are scraping up the gravel from the bed-rock and wheeling it to their sluices where the washing is done. It is a very expensive way of working it, but yet it pays to work a small portion of the ground in that way. It will take only a few weeks to work it all out, however, and then they will be compelled to seek other places to labor. —*Nevada Transcript*.

Safety Lamps and their Management.

At a recent meeting of the North Staffordshire Institute of Mining and Mechanical Engineers, Mr. Charles Gordon read a paper on "Safety Lamps and their Management." He observed that the mining community was now anxiously expecting the report of the Royal Commission, which would no doubt greatly influence and direct the choice of the lamps of the future. It was highly probable that the ordinary Davy and the Clanny would receive their death-blow at the hands of the Commissioners; the former (which had been for many years in high favor and rendered good service) from its security in explosive mixtures, where there were strong currents, and the inducement to smoking which it presented, besides the ease with which a slight blow with a pick or a stone might instantly change it from a useful assistant to a highly dangerous weapon. The Clanny, which had always been a useful road lamp, was to be condemned from the element of danger arising from a sudden fracture of the glass without extinguishing the flame. The lamp of the immediate future that would probably be recommended by the Commissioners would be the Williamson, the Protector, or the Belgian Mueseler. The Protector and the Mueseler were formed on somewhat similar lines, whilst the Williamson might be described as a modification of the Stephenson and the Clanny. It had two glasses—the inner one resembling a Stephenson, and fitted with a copper top or cap. The outer glass resembled that of a Clanny. The method of supplying the Williamson lamp with air was similar to that of a Stephenson, but its great superiority over that lamp was due to the fact that the whole of the air must pass through a gauze to feed the flame. It was said that in all its trials this lamp had never been exploded. It further possessed the property of remaining alight when tilted, which lamps of the Mueseler pattern did not. The weights of lamps were as follows: Protector and Williamson, each 3 pounds 4 ounces; Clanny, 2 pounds 10 ounces; Stephenson and Mueseler, each 2 pounds 4 ounces; Davy, 2 pounds. The weight of the lamp should be studied, and especially of those carried by the firemen and officials appointed to examine the workings. It was only those who had to carry lamps all day, that could understand the fatigue it occasioned, and the lighter the lamps were produced, and the more convenient they were to handle, the better prospect was there of having the workings promptly examined. A lamp should not be made so sensitive as to go out at the least shock. In many cases lamps might be suddenly extinguished and leave the workman in total ignorance whether the cause was a shock or the presence of an explosive mixture. With regard to the attempts that had been made to produce an electric lamp for mining purposes, it was obvious to all acquainted with underground working that nothing but a self-contained lamp would meet the want. All lamps dependent on fixed wires must fail, since, from the ever-changing condition of mines, they were continually in danger of breakage, thereby causing the severance of the electric current. For permanent roads that stood well and for stations the electric light might be beneficially employed, but when that was the case it was generally safe to use oil lamps. The "Hope" safety lamp was a good pattern. This lamp, while evidently adapted from the railway carriage lamp, possessed other features, such as the gauze over the flame, the improved method of adjusting the wick, the fact that it might be fastened either with a padlock or lead rivet, and the avoidance of danger from fire. After noticing the various kinds of lamps now in use, and the districts in which they were most in favor, he quoted from a report of experiments made in October last in the Aldwarke Main colliery, showing that the Davy was exploded in each case, while for four hours attempts were made without effect to explode the Mueseler and Williamson lamps. Having made some remarks on the locking of lamps, he gave details respecting their illuminating power, and made suggestions as to the management of lamp houses. He next dwelt on the subject of testing lamps, and described a testing apparatus lent for the occasion by Messrs. Edwards, of Wakefield, who also lent a large collection of lamps, ancient and modern, for the illustration of the paper.

ITS FRUITS.—It is not generally believed by the miners that the intention of the valley people is to stop all mining. Such, however, is the intention, and it is just as well to look the danger squarely in the face. We know fair promises have been made as to the feeling in regard to drift and quartz mining, but promises are not of much account when belied by facts. In Sawyer's decree it is decreed that the defendant's and their officers or servants be perpetually enjoined and restrained from discharging or dumping into any of the branches of the Yuba river, any of the tailings or refuse matter whatever arising from mining. It also prohibits the enjoined companies from selling water to be used for any kind of gravel mining. The effect of this has been to take the water

from the Derboe, a drift mine, throwing out of employment a large number of men. It also puts an effectual damper upon the scheme of drifting the hydraulic mines, and disabuses, we hope, for all time, the minds of those persons who expected when the hydraulic mines were stopped to get cheap water to work small drift and bank diggings. The decree, in effect, shuts the water off at the head dam, not permitting him to use, or permit to be used, any of his water for mining purposes. The symptoms of another assault upon the mining industry are beginning to appear. This time it is the bar outside the heads at San Francisco that is being shoaled by the earth held in suspension. This is beyond the sand and gravel range, and we may expect now to hear all the changes rung upon this not exactly new grievance, and for which mining alone will be held responsible. We are not of those who think mining can be altogether stopped, but wish to put our people on their guard. —*Mountain Messenger*.

Electricity and Mining Appliances.

Mr. George G. Andres, in his "Continental Colliery Notes," describes several applications of electricity to the mechanical appliances of mining. The latest novelty in mining machinery is an electrical coal-cutter, or, to describe it more accurately, a coal-cutter of the ordinary type driven by electricity. It is obvious that electricity can be readily applied to this purpose, and it is strange that we have not heard of the application before. The advantages afforded by wires over pipes for the transmission of the motive agent are so clearly apparent that they need not be pointed out. The electric motor is of extremely simple construction, and designed for the circumstances under which it will have to work. Thus, one of the conditions of success has been fulfilled, and it is the one over which inventors usually stumble. In many cases, the inventor is not what is called a "practical" man, that is, one who is particularly acquainted with the work which the machine is designed to perform. As a consequence, it is defective in some details, and, failing in consequence to satisfy some one of the conditions of practice, it is condemned and thrown aside. Many a useful invention has been lost in this way that in competent hands might have been made a success. The electric coal-cutter, if reports are to be believed, will not fail on this account, for it is in the hands of men who know well what they have to deal with. It is said to be an American invention modified by a French mining engineer. Curiosity has been greatly excited respecting this machine, and the results of the trials about to be made are awaited with interest. It is easy to foresee, that however satisfactory the machine may perform its work, it cannot be used in a fiery atmosphere, on account of the inevitable sparking at the brushes, or other moving contacts. This fact will limit its application to non-fiery workings. Another obvious application of electrical power to mining purposes is to haul coal from dip workings. Portable hauling machinery of this nature could be constructed that would be perfectly reliable in action. This is a point to which attention might profitably be directed.

There have been some attempts made to employ electricity as the motive power for rock drills. These attempts have failed for the reason I have pointed out in the preceding paragraph. If electricity is to be successfully applied to this use, it must be by no means of a rotary motion. A permissive action may, of course, be derived from this; but it is a necessary condition of success that the motor revolve. Jalorinek's drill, which I have recently described, might be very effectively driven in this way. But whatever the construction of the motor may be, its moving parts at least must be protected against the water and the grit to which it will be exposed underground. It should not be difficult to enclose the whole of the motor within a metal casing, and such a shield would not only protect it against grit and water, but would render it capable of bearing the rough usage it cannot escape in the hands of miners. I give this advice to inventors gratis, and offer them the suggestions free of charge.

I have another word to say on the matter of electric safety lamps, on which I made some remarks a few weeks ago. All, so far as I observed, who discuss the question in this country, proceed on the assumption that the lamps are to be fed from wire leads as in the case of lighting at surface. I think practical men are pretty well agreed that the lighting of fiery workings cannot be carried out in this way. Irrespective of the trouble attending the use of wire leads in underground workings, the dangers of capture and "short circuits" rob the system of the advantage which the lamp itself gives it. But to combat this system is to fight the wind. No one, so far at least as my observation has extended, is thinking of lighting in this way. Those who are occupied in this work of lighting fiery places provide means for generating the current within the lamp itself by some form of galvanic cell of either a primary or a secondary nature. And it was to those efforts that my recent remarks were directed. The problem is beset with difficulties, but there is good ground for hoping that a sufficiently practical solution will shortly be arrived at. The chief difficulty has been the want of hearty co-operation on the part of mining men.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 253 Market St., S. F.

FOR WEEK ENDING FEBRUARY 12, 1884.

- 293,307. SPOKE EXTRACTOR—R. N. Caughell, Shedd, Ogn.
293,237. OIL CUP—R. A. Fisher, S. F.
293,443. STAMP CASE FILLER—A. M. & S. M. A. Forster, S. F.
293,323. TWO WHEELED VEHICLE—Geo. E. Guerne, Santa Rosa, Cal.
293,453. HOSE COUPLING—Sam'l. Hamer, Salt Lake City, U. T.
293,491. PUMP—N. Hemenway, Napa, Cal.
293,579. CAR COUPLING—Thos. C. Jones, Willows, Cal.
293,335. VACUUM PRESS PERCOLATOR—C. R. Knapp, S. F.
293,595. KIOSK—A. C. Y. Ribot, Los Angeles, Cal.
293,338. HARVESTER—Alex. Robinson, Benicia, Cal.
293,526. CHIMNEY CAP—M. Scholl, S. F.
293,549. RAILWAY RAIL CHAIR—Geo. Weeks, East Oakland, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

HARVESTER.—Alexander Robinson, Benicia, assignor to Benicia Agricultural Works, No. 293,358. Dated Feb. 12, 1884. This improvement in headers consists in a spring hinge connection between the pole and main frame of the header, whereby the operation of raising the front of the header from the ground is rendered easy. In implements of this class, the pole or its crossbar is hinged to the main frame, and a long lever, which is attached to and fulcrumed upon said frame, is operated to raise or lower the front by turning the frame on its main wheels as fulcrum; but when the frame has been turned down at an inclination, it is difficult to raise it, because of its great weight and the thrust of the horses, and in order to assist the operation, ballast placed on the end of the lever is commonly employed as a counterbalance, and various springs have been attached to the lever and pole to accomplish the object. These, however, merely assist the operation of the lever, and are to a certain extent cumbersome and in the way, and are not of sufficient compass to allow the lever enough play, but will, as they are progressive in their strength, interfere with a free movement of the lever. By this invention of Mr. Robinson he accomplishes the result directly, by the connection or hinge between the beam and frame.

TWO WHEELED VEHICLES.—George E. Guerne, Santa Rosa, No. 293,323. Dated Feb. 12, 1884. This is one of the "breaking carts," as they are sometimes called; the two wheeled vehicles now so popular here. In this instance the improvements consist in novel supporting springs for the body, and in the means for regulating or adjusting the body to a level. The object of the invention is to render the vehicle a comfortable and easy riding conveyance, by obviating or preventing that unpleasant motion which the seat receives by reason of the joggling of the horse.

SPOKE EXTRACTOR.—Robt. N. Caughell, Shedd, Oregon, No. 293,307. Dated Feb. 12, 1884. This is a machine for removing spokes from a hub. The patent covers improvements on a previously patented device. Long jaws, with two clamping rings, afford great gripping surface, and the extractor can be fitted on the spoke without slipping, notwithstanding that the jaws are padded to prevent injury to varnish on highly finished spokes. Both in construction and operation the device is much improved.

SECRETARY CHANDLER, in answer to the Chamber of Commerce of San Francisco, asking an increase of the naval force, says: The Navy Department is in favor not only of building the engines, but of providing side-turrets and armaments for all four of the monitors, (the Monadnock, Puritan, Amphitrite and Terror), and making them formidable and effective armored vessels. If preference and priority of completion should be given to any one, it should be extended to the Monadnock, on account of its importance to the Pacific coast.

THE land act passed by the British Columbian Legislature gives pre-emptors the right to take up land west of the Cascades to the extent of 160 acres, and east of the Cascades 320 acres, at \$1 per acre. Speculators are limited to 640 acres, at \$2.50. Bunch grass or grazing lands \$1 per acre, coal lands \$2.50, with a royalty of five cents per ton upon coal lands acquired subsequent to the passage of the bill.

It is stated that if the South Yuba Ditch Company had been a defendant in the late debris suit and had been stopped from selling water, some 200 quartz mill stamps would have been "hung up."

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Ingersoll, D2 3", beat National 3 1/2".....	.505 " "
Ingersoll, E 3 1/2", beat Rand 3 1/2".....	.500 " "
Ingersoll, E 3 1/2", beat National 3 1/2".....	.321 " "
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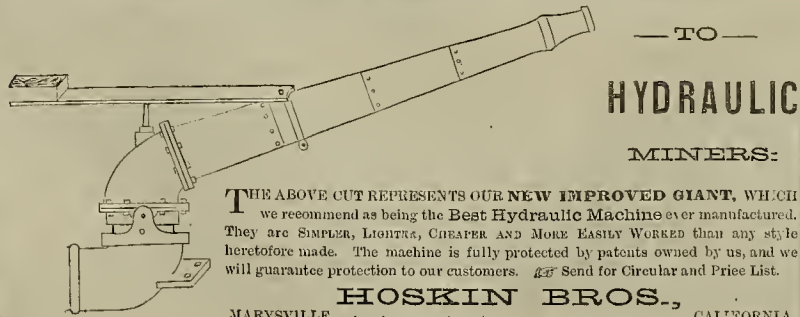
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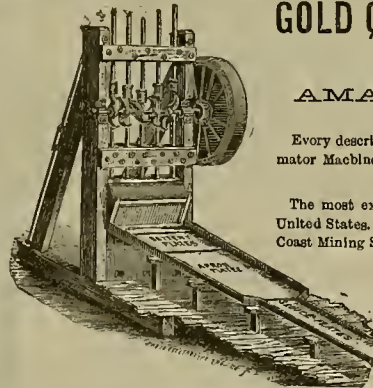
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PACIFIC POWER CO.

Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

News in Brief

It is stated that the Judson manufacturing company intend establishing a reading room and library at their works.

The pump of the Alta mine on the Comstock, running six strokes a minute, is raising 604,800 gallons of water in 24 hours.

The Bisbee murderers all intend taking an appeal to the Supreme Court of Arizona, but it is thought that that tribunal will be overruled by Judge Lynch.

The Mexican Secretary of the Treasury has imposed five per cent additional importation duties on all dutiable goods from May 15th. He is also taking steps for the regulation of stamp taxes.

The Boston and Savannah Steamship Company is seeking to limit its liability for damages on account of the loss of the *City of Columbus*. The petition asserts there was no negligence or incompetency on the part of the company.

A Private telegram from Washington, received at Seattle, states the canal bill now before Congress, giving a company the franchise to connect Lake Washington with Puget Sound and collect tolls thereon, will undoubtedly pass.

It is now proposed by the French government, in regard to American bacon, to provide for its inspection at ports of entry at the expense of the government—the expense to be covered by a charge of 25 centimes per box.

The British Government has tendered to the United States the use of the steamer *Alert* for the Greely relief expedition. She was built specially for use in the Arctic, and will be used as a supply ship and follow in the wake of the other vessels.

JUDGE LAWRENCE, Controller of the Treasury, and one of the largest wool-growers in the country, says that since the tariff act of May last, the price of domestic wool has decreased 15 per cent. Wool-growers hope for nothing from this Congress, but will keep demanding restoration of the tariff, and to secure this end will organize.

WILL PROSPECT.—We are reliably informed and pleased to note the fact, that the Sierra Buttes Company intends to change the policy which has heretofore prevailed in its management, of confining its attention exclusively to the Buttes ledges, and will, at no distant day, take hold of some of the numerous ledges in the vicinity of Sierra City, and develop them. The owners of the Buttes mine live in London, and have been largely interested in mines in India or some other far-away country. By these investments we learn they have lost something like forty millions of dollars, and have now resolved to turn their attention more directly to California quartz. The owners of the Plumas Eureka have already branched out a little in this direction. Some little time ago they bonded the Halstead mine, Plumas county, for sixty thousand dollars. Four men were put to work, and after a little over three hundred feet of tunnel had been run the lode was reached. Only a few feet had been run into the ledge which is estimated to be about twenty feet thick. The rock is not exceedingly rich, but is fair. With but a trifling outlay this company has demonstrated that the Halstead is worth looking after. At Sierra City there are a dozen ledges, any one of which might be developed at a comparatively slight expense by a company that has unlimited capital. The Buttes company can prospect far cheaper than any other, for the reason that it has all the management needed for any number of mines; its agents are on the ground and can give to the work their personal attention; it can get its supplies cheaper, and has at its disposal men trained in the business of quartz mining. We hope the report is true, and the early spring may see this work of development begun.—*Mountain Messenger*.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

"The Baldwin" Hotel

Ranks high up in public favor and is regarded as second to none in the country. It contains 600 rooms and is elegant and first class in every appointment. Mr. H. H. Pearson, the proprietor, with large and popular experience has the rare faculty of anticipating the wants of his guests. Traveling men in speaking of the Baldwin always do so feeling a sense of gratitude, for it always suggests pleasant associations and good living. It is located on Market street, corner Powell, in the heart of San Francisco. Among its guests are noticed the names of the leading and substantial men of this country.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove, walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQNT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alaska M Co.	California.	4.	2,000.	Feb. 6.	Mar. 8.	Mar. 28.	A. Judson.	320 Sansome st.
Alaska Hydraulic M Co.	California.	5.	25.	Jan. 28.	Mar. 25.	Apr. 25.	P. M. Scott.	326 Montgomery st.
Alta M Co.	Nevada.	28.	25.	Jan. 28.	Mar. 3.	Mar. 24.	W. H. Watson.	302 Montgomery st.
Alpha Con M Co.	Nevada.	17.	50.	Jan. 4.	Feb. 11.	Mar. 5.	W. Willis.	309 Montgomery st.
Belmont M Co.	Nevada.	36.	15.	Feb. 20.	Mar. 30.	Apr. 30.	J. W. Pew.	310 Pine st.
Blue Bluff Gravel M Co.	California.	5.	02.	Jan. 17.	Feb. 26.	Mar. 14.	J. Stadfeldt.	419 California st.
Bodie Con M Co.	California.	4.	50.	Dec. 21.	Jan. 30.	Feb. 29.	G. W. Sessions.	309 Montgomery st.
Belle Isle M Co.	Nevada.	6.	15.	Jan. 3.	Feb. 6.	Mar. 27.	J. W. Pew.	310 Pine st.
Benton Con M Co.	Nevada.	12.	20.	Feb. 5.	Mar. 11.	Mar. 27.	H. Watson.	302 Montgomery st.
Best & Belcher M Co.	Nevada.	28.	50.	Feb. 14.	Mar. 14.	Apr. 2.	W. Willis.	309 Montgomery st.
California M Co.	Nevada.	10.	20.	Jan. 4.	Feb. 11.	Mar. 8.	C. P. Gordon.	309 Montgomery st.
Copperopolis M Co.	Arizona.	1.	5.	Jun. 2.	Feb. 6.	Feb. 25.	H. H. Sayre.	309 Pine st.
Caborena M Co.	Mexico.	8.	10.	Jan. 8.	Feb. 15.	Mar. 17.	W. J. Taylor.	220 Sansome st.
Excelsior Water Co.	California.	5.	50.	Jan. 22.	Mar. 1.	Mar. 21.	H. B. Winkler.	215 Sansome st.
Flintrock Gravel M Co.	California.	14.	5.	Jan. 5.	Jan. 27.	Mar. 18.	H. Kunz.	290 Sansome st.
Eureka Con M Co.	Nevada.	7.	1,000.	Jan. 15.	Feb. 18.	Mar. 10.	E. H. Wilson.	309 California st.
Goodshow M Co.	California.	15.	10.	Jan. 13.	Feb. 13.	Mar. 3.	C. H. Harvey.	309 California st.
Hale & Norcross M Co.	Arizona.	80.	50.	Jan. 15.	Feb. 19.	Mar. 13.	J. F. Lightner.	309 Montgomery st.
Hend & Belcher M Co.	Arizona.	1.	50.	Feb. 2.	Mar. 2.	Apr. 19.	A. B. Paul.	320 Montgomery st.
Indian Spring Drift M Co.	California.	1.	30.	Feb. 18.	Mar. 22.	Apr. 19.	A. B. Paul.	320 Montgomery st.
Jupiter Deep Blue Gravel M Co.	Cal.	1.	1,000.	Dec. 17.	Feb. 16.	Apr. 4.	G. Lande.	426 California st.
Julia Con M Co.	Nevada.	19.	10.	Jan. 3.	Feb. 5.	Mar. 23.	H. A. Charles.	419 California st.
Mayflower Gravel M Co.	California.	22.	10.	Jan. 5.	Feb. 5.	Mar. 27.	J. Morison.	326 Montgomery st.
Morrell Con M Co.	California.	1.	10.	Jan. 24.	Feb. 1.	Mar. 19.	J. Donovan.	436 Montgomery st.
Milton M Co.	California.	1.	1,000.	Feb. 10.	Mar. 24.	Apr. 14.	H. Piellier.	320 Sansome st.
Mammoth Bar M Co.	California.	4.	15.	Jan. 14.	Feb. 13.	Mar. 10.	J. W. Pew.	310 Pine st.
Marathon M Co.	Nevada.	25.	30.	Dec. 26.	Jan. 35.	Mar. 29.	C. E. Elliott.	309 Montgomery st.
Martin White M Co.	California.	17.	20.	Jan. 2.	Feb. 2.	Mar. 6.	R. B. Holmes.	309 Montgomery st.
Marshall M Co.	California.	1.	10.	Jan. 14.	Feb. 23.	Mar. 12.	R. Wegener.	414 California st.
New Coso M Co.	California.	17.	40.	Jan. 18.	Feb. 28.	Mar. 1.	E. B. Clement.	710 Washington st.
Northern Belle.	Nevada.	2.	8,000.	Jan. 30.	Mar. 10.	Apr. 4.	W. Willis.	309 Montgomery st.
North Belle Isle M Co.	Nevada.	7.	10.	Jan. 3.	Feb. 8.	Mar. 29.	J. S. Jordan.	310 Pine st.
Ophir M Co.	Nevada.	2.	50.	Feb. 6.	Mar. 6.	Mar. 26.	R. B. Holmes.	309 Montgomery st.
Potosi M Co.	Nevada.	14.	50.	Jan. 18.	Feb. 20.	Mar. 13.	W. E. Dean.	309 Montgomery st.
Pinal Con M Co.	Arizona.	5.	10.	Dec. 15.	Feb. 15.	Mar. 14.	A. Adler.	309 Montgomery st.
Pittsburg M Co.	California.	17.	20.	Jan. 3.	Feb. 8.	Mar. 29.	R. Wegener.	414 California st.
Rainbow M Co.	California.	9.	20.	Jan. 20.	Feb. 2.	Mar. 6.	J. S. Jordan.	310 Montgomery st.
Savage M Co.	Nevada.	58.	50.	Feb. 5.	Mar. 10.	Mar. 31.	E. B. Holmes.	309 Montgomery st.
Sierra Nevada 8 M Co.	Nevada.	78.	1,000.	Jan. 16.	Feb. 20.	Mar. 17.	E. L. Parker.	309 Montgomery st.
San Miguel & Trinidad M Co.	Mexico.	4.	50.	Jan. 11.	Feb. 19.	Mar. 10.	C. G. Brooks.	210 Front st.
Union Gravel M Co.	California.	18.	50.	Jan. 13.	Feb. 13.	Mar. 18.	H. Piellier.	309 Montgomery st.
Utah 8 M Co.	Nevada.	47.	1,000.	Jan. 4.	Feb. 11.	Mar. 3.	C. C. Pratt.	309 Montgomery st.
Union Con M Co.	Nevada.	25.	50.	Jan. 4.	Feb. 7.	Mar. 27.	J. M. Huntington.	309 California st.
Wibaux M Co.	California.	1.	25.	Feb. 13.	Mar. 28.	Apr. 28.	R. Elton.	310 Pine st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
El Dorado M Co.	California.	J. H. Sayre.	320 Pine st.	Annual.	Mar. 10.
Gold Lead M Co.	Nevada.	J. Bronzaui.	137 Front st.	Special.	Mar. 6.
Watt Blue Gravel M Co.	California.	R. Wegener.	414 California st.	Annual.	Feb. 18.

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Feb. 15.
Bulwer Con M Co.	California.	W. Willis.	309 Montgomery st.	10.	Jan. 23.
Contention Con M Co.	Arizona.	D. C. Bates.	309 Montgomery st.	25.	Jan. 12.
North Belle Blue Gravel M Co.	California.	T. Wetzel.	322 Montgomery st.	25.	Jan. 12.
Idaho M Co.	California.			4.00.	Dec. 2.
Jackson M Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Jan. 4.
Kentuck M Co.	Nevada.	J. W. Pew.	Pine st.	10.	Feb. 19.
St. Diago M Co.	Nevada.	R. W. Heath.	Pine st.	25.	Nov. 26.
Sierra Nevada 8 M Co.	California.	W. Willis.	309 Montgomery st.	25.	Feb. 12.
Silver King M Co.	Arizona.	J. Nash.	315 California st.	25.	Dec. 15.
Syndicate M Co.	California.	J. Stadfeldt.	419 California st.	10.	Feb. 5.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 30.	WEEK ENDING Feb. 6.	WEEK ENDING Feb. 13.	WEEK ENDING Feb. 20.
Alpha.	1,001.00	2,001.70	1,991.55	1.75
Alta.	1.50	1.75	1.30	1.90
Andes.	.45	.50	.40	.35
Albion.	.45	.50	.40	.35
Argenta.	.05	.05	.10	.05
Bodie.	.95	1.05	.90	.80
Best & Belcher.	2.65	2.80	2.40	2.60
Bethel.	.70	.70	.70	.70
Belle Isle.	.10	.20	.15	.40
Bodie Con.	7.25	8.75	10.00	13.75
Benton.	.50	.35	.35	.20
Bodie Tunnel.	1.00	1.10	1.40	.25
California.	.05	.10	.20	.25
Challenge.	.25	1.25	.05	.25
Confidence.	2.05	2.15	2.05	2.15
Concord.	1.00	1.00	1.00	1.10
Con. Imperial.	.25	.30	.20	.20
Con. Virginia.	.25	.30	.20	.20
Crown Point.	1.00	1.00	1.20	1.00
Elko Con.	30	1,001.00	2,001.90	2,301.15
Eureka Con.	2.00	2.25	1.85	1.70
Eureka Tunnel.	.40	.50	.40	.35
Excelsior.	.40	.50	.40	.35
Grand Prize.	.10	.20	.15	.15
Gould & Curry.	1.50	2,001.60	1,901.60	1,801.50
Hale & Norcross.	1.60	1,601.45	1,601.30	1,501.35
Holmes.	.10	1.20	1.20	1.50
Independence.	.50	.50	.40	.35
Julia.	.05	.10	.10	.10
Justice.	.25	.25	.30	.25
Kentuck.	.10	.10	.10	.10
Mon. White.	.30	.30	.30	.30
Mon.	1.30	1.80	1.35	1.40
Mexican.	1.9	2,45	2,30	2,45
Mt. Diablo.	2.75	2.75	2.75	2.00
Mt. Potosi.	.35	.45	.10	.35
Northern Belle.	2.20	2,50	2,30	2,95
North Noonday.	.10	.15	.20	.25
Navajo.	2.20	2,50	2,30	2,95
North Belle Isle.	.10	.15	.20	.25
Ocidental.	.25	2,30	1,45	1,50
Ophir.	2.25	2,30	1,45	1,50
Overman.	.30	.30	.35	.30
Oro.	.60	.70	.60	.65
Potosi.	.30	.30	.30	.30
Pinal Con.	.60	.70	.60	.65
Savage.	.80	.90	.70	.85
Seg. Belcher.	2.65	2,75	2,40	2,80
Sierra Nevada.	2.65	2,75	2,40	2,80
Silver Hill.	.10	.10	.10	.10
Silver King.	.50	6.00	6.00	6.00
Scorpion.	.35	.40	.25	.40
Tasajara.	.25	2,50	2,30	2,85
Union Con.	1.00	1,20	1,00	1,20
Utah.	1.00	1,20	1,00	1,20
Ward.	2.10	2,45	2,25	2,50
Yellow Jacket.	2.10	2,45	2,25	2,50

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OUR BUREAU can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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C. E. CURRY—Kern and Fresno counties.

A. S. DENNIS—San Mateo county.

A. C. KNOX—Tehama, Yuba and Yolo counties.

Wm. R. McQUIDDY—Tulare county.

F. M. THOMAS—Fresno county.

Ed. MACK—Santa Clara county.

GLADSTONE says that the Government is anxious for the passage of a bill providing for the appointment of a Minister for Scotland.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Feb. 21, 1884.	
VINTIMONY—Per pound.	14 @ 5
IRON—American Pig, soft, ton.	30 @ 20
Scotch Pig, ton.	24 @ 28 50
American White Pig, ton.	28 @ 22 50
Oregon Pig, ton.	24 @ 22 50
Clippers Cap, Nos. 1 to 4.	32 50 @ 35 00
Reinforced Bar.	31 @ 33
Horseshoes, keg.	5 @ 50
Nails.	14 @ 7
Norway, according to thickness.	6 @ 15
Steel—English Cast, lb.	14 @ 17
Black Diamond, ordinary sizes.	14 @ 17
Drill.	15 @ 16
Machinery.	12 @ 14
COPPER—Ingots.	22 @ 26
Braziers' sheet.	31 @ 32
Fire-hose sheets.	31 @ 32
Nails.	17 @ 18
Bolt.	31 @ 32
Old.	31 @ 32
Bar.	31 @ 32
Cement, 100 lb.	12 @ 14
LEAD—Pig.	4 @ 40
Sheet rod.	5 @ 60
Pipe.	7 @ 20
Sheet.	8 @ 20
S hot, discount 10% on 500 bags: Drop, 8 bag.	2 @ 10
Black, 8 bag.	2 @ 10
Chilled, do, 8 bag.	2 @ 10
TIN PLATES—Charcoal.	6 @ 60 50
Coke.	5 @ 50 50
Banca Tin.	24 @ 20
Australian.	21 @ 20
L C Charcoal, Redding, Best.	6 @ 60 80
ZINC—By the cask.	19 @ 19
Sheet, 73 lb, 7 to 10 lb, less the cask.	9 @ 10
N LLS—Assorted sizes.	3 @ 40 75
QUICKSILVER—By the flask.	34 @ 30
Flasks, new.	1 @ 85
Flasks, old.	85 @ 85

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Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing only one cent) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some responsible party requested to stop it, we shall positively demand payment for the time it is sent.

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Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

ASSESSMENT NOTICE.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador county, near Drytown, California.

NOTICE is hereby given, that at a meeting of the Directors, held on the 30th day of January, 1884, an assessment (No. 44) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 402 Front street, room 8, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 15th day of March, 1884, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 10th day of April, 1884, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

MARK T. ASHBY, Secretary.

OFFICE—No. 402 Front Street, Room 8, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

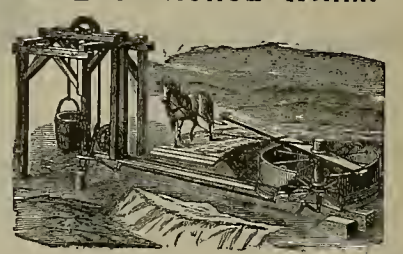
San Francisco, February 2, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 64, of twenty-five cents (25c) per share, was declared, payable on TUESDAY, February 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.

OFFICE—Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

MINERS' HORSE WHIM.



ONE HORSE CAN EASILY HOIST OVER 1,000 LBS. At a depth of 500 feet. The Whim is made of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of this whim is bolted to bed-timbers

TATUM & BOWEN,

25, 27, 29 and 31 Main St., near Market, SAN FRANCISCO.

and

187 Front Street, PORTLAND, OREGON.

SOLE AGENTS FOR

The Albany Lubricating COMPOUND AND CUPS, THE ALBANY SPINDLE OIL, THE ALBANY CYLINDER OIL, THE ALBANY VALVOIL, The Sight Drop Cylinder Lubricator.

WE ALSO IMPORT LARD OIL, WEST VIRGINIA LUBRICATING OIL, DOWNER'S MINERAL SPERM SKID OIL, ETC.

These Lubricants have been for the last eight years, and are now, in general use in nearly all the mills, mines and steamers on this Coast, and the fact that the demand constantly increases is sufficient evidence of their superiority.

GIANT POWDER

MANUFACTURED UNDER ALFRED NOBLE'S Original and only valid Patents for NITRO GLYCERINE Powders, which has been and still is of such immense advantages to the Miner, Railroad Man and the Engineer. All other Nitro-Glycerine Compounds are simply imitations and adulterations of the Original Giant Powder. The Giant Powder Company manufacture three grades of Powder, which are the Safest and Strongest High Explosives in the market. The Original Nitro Glycerine Compound, GIANT POWDER or DYNAMITE, is acknowledged by all the great chemists of the world as unapproached by any other compound. The Giant Powder Company have acquired the exclusive right to manufacture "NOBLE'S EXPLOSIVE GELATINE," which contains 96 per cent. of Nitro-glycerine. It is still stronger than Dynamite, and even safer in handling. This explosive was used in constructing the Mont Cenis Tunnel. THE JUDSON POWDER is a black Powder owned and manufactured by the Giant Powder Company; is from three to five times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it Breaks More Ground, Pulverizes Better, and Saves Time and Money. The only difficulty heretofore experienced by some consumers of this Powder has been that it required more time to get it to the bottom of a deep borehole. This has now been entirely overcome, and our JUDSON IMPROVED is now as dry as the ordinary Blasting Powder and runs as freely.

Triple, Quadruple and Quintuple Caps and all grades of Fuso for Sale.

BANDMANN, NIELSEN & CO.,

General Agents, San Francisco, Cal.

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THE CHEAPEST AND BEST STEAM PUMP for Lifts from 10 to 70 ft. FOR IRRIGATING PURPOSES

And all General Work where a Simple Durable Pump is Required.

NO VALVES! NO PISTON! NO OIL REQUIRED!

Can be Run by a Child.

EACH PUMP GUARANTEED.

PRICE—One-tenth of an ordinary Steam Pump, same capacity.

Call and See One in Actual Operation.

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18 and 20 Fremont Street, San Francisco

W. E. CHAMBERLAIN, JR.

D. A. ROBINSON.



Life Scholarships, \$70.

PAID IN INSTALLMENTS, \$75.

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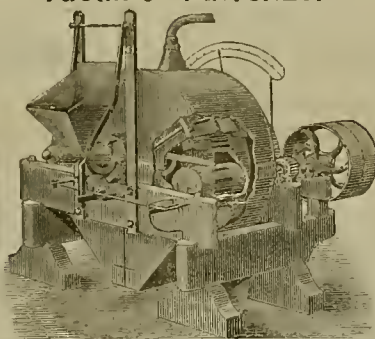
SPECIAL NOTICE

In Consequence of the Late Fire, we are Temporarily Located at the SYNAGOGUE Mason Street, between Post and Geary Streets, San Francisco.



FOR THE BEST IMPROVED ARTIFICIAL LIMBS ADDRESS MENZO SPRING, 9 Geary St., SAN FRANCISCO, CAL. OFFICE & UP-STAIRS.

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WORKS ORE WET OR DRY.

Awarded SILVER MEDALS in 1882 and 1883 By Mechanics' Institute.

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308 Mission Street, S. F., Cal.

By W. I. TUSTIN, Inventor and Patentee.

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EUCALYPTUS BOILER SCALE

Preventive and Remover.

(Patented May 8, 1883.)

In use in 1,000 Boilers on Steamboats, Locomotives, Mills, Mines, Foundries, etc., in California. An

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Prevents the iron from rusting or pitting. Shipped in ten gallon cases at 50 cents per gallon, by

DOWNIE B. I. P. CO.,

No. 7 First Street, San Francisco.



TRINITY SCHOOL CHURCH, BOARDING AND Day School for Young Men and Boys, 1334 Mission St., San Francisco. Prepares for College and University. Easter Session opens Thursday, Jan. 4, 1884. Refers to—Wm. F. Babcock, Esq., Col. E. E. Kyrle, Joseph Penning, Esq., Gen. L. H. Allen, Wm. T. Coleman, Esq., Geo. W. Gibbs, Esq. For information, address, REV. E. B. SPALDING, Rector.

Remittances to this office should be made by postal order or registered letter, when practicable. Cost of postal order, for \$10 or less, 8 cents; for registered letter, in addition to regular postage (3 cts. per half ounce), 10 cts.

MECHANICS' INSTITUTE INDUSTRIAL EXHIBITION

(Of the City of San Francisco.)



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—MANUFACTURERS OF—

Machine Tools, Hydraulic Machinery and PORTABLE FORGES, 18 & 20 Fell St., opp. cor. 10th and Market, San Francisco.

Awarded 1st Premium for Engine Lathe, and Special 1st Premium for Portable Forge

GOLD MEDAL AWARDED

—AT—

Mechanics' Fair, 1883,

—FOR—

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

FOR

Best Hoisting Engine and Boiler Combined.

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Machine and

Engine Works,

109 & 111 Beale St.,

SAN FRANCISCO.



WESTERN IRON WORKS,

BIGELOW, SIMS & MORRIS

—MANUFACTURERS OF—

CHAMPION METALLIC WHEELBARROWS,

First Premium, Mechanics' Fair, 1883.

We claim this Barrow to be superior to all others manufactured on this Coast. For railroad, mining, grading and general contractor's use, they stand without an equal. We guarantee them to stand more hard usage than any other Barrow yet manufactured. We solicit correspondence.

123 & 125 Beale St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882

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No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

FIRE AND WATER PROOF PAINTS.

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Cheapest and Best

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DWELLINGS.

Averill Mixed Paints.

Prepared Ready for Immediate Use, and of any Shade or Color Desired.

Put up in 5, 1, 1/2 and 1/4 gallon cans and tins.

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Also Sole Agent for the Genuine San Francisco Rubber Paints, and Dealer in OILS and PAINTERS' MATERIALS.

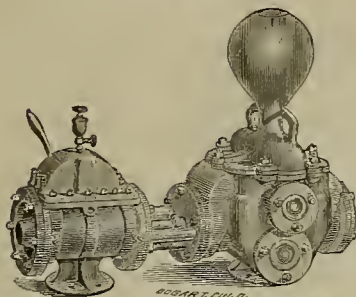


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22 and 24 Fremont St.,
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and Pumping Machinery.**

**THE NILES' TOOL WORKS.****E. GOULD & EBERHARDT,**

Manufacturers of
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MANUFACTURERS OF
STEAM ENGINES, BOILERS AND ALL
Kinds of Machinery for Mining Purposes.
Mining Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.
Front Street, Between N and O Streets,
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Golden State & Miners Iron Works.
Manufacture Iron Castings and Machinery
of all kinds at Greatly Reduced Rates.
STEVENSON'S PATENT
Mold-Board **AMALGAMATORS,**
Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,
No. 125 First Street, Opposite Minna.
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All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
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boat Bells and Gongs of superior tone. All kinds of Cocks
and Valves, Hydraulic Pipes and Nozzles, and Hose Con-
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Engineer and Machinist,
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Steam Engines, Flour Mill,
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Manufacturers of B. E. Hennickson's Patent Automatic
Safety Catches for Elevators. All kinds of machinery
made and repaired. **ORDERS SOLICITED.**

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The undersigned are in receipt of regular supplies from Cardiff, Wales, and offer the COKE
for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
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HEINE PATENT SAFETY BOILER.
RISDON IRON AND LOCOMOTIVE WORKS,

Sole Agents for the Pacific Coast,

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Economy in space and fuel. Safety at high
pressures. Freedom from scaling. Equally
adapted for power and heating purposes.
Especially adapted for mills, factories, hotels,
stores or any place where safety is a necessity.
Will work well with muddy water and any kind
of fuel.

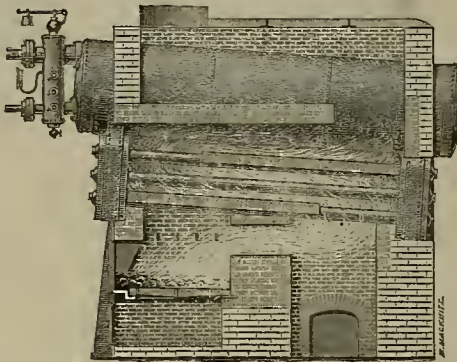
TESTIMONIALS.

St. Louis, Mo., Sept. 23, 1883

Messrs. Adolphus Meyer & Co.—GENTLEMEN.
We cheerfully certify that the "Heine Patent
Safety Boiler" put up by you in our establish-
ment has proved very satisfactory in its working.
The chief points of excellence in the "Heine
Safety Boiler" are its economy in fuel and space,
freedom from scaling, aptitude for power and
heating purposes, working equally well with clear
and muddy water. We warmly recommend it to
all using steam machinery. Yours truly,
ANHEUSER-BUSCH BREWING ASS'N.

OFFICE OF Supt. of ROYAL RAILWAYS,
BERLIN, Sept. 23, 1883.

To Mr. H. Heine, Civil Engineer. In reply to
your inquiry of September 2d, we respectfully in-
form you that the three boilers built under your
patents, under steam since September 25, 1881, at the Alex-
ander Platz Depot, as well as the two at Friedrich Strasse
Depot, under steam since September 22, 1882, have given
good satisfaction, requiring no repairs whatsoever to date.
The internal cleaning of the boiler was always accomplished



with ease on account of the convenient arrangement of the
tube caps, the adhesion of scales being fully prevented
thereby, and the boilers kept in prime condition.

(Signed) BRAUCKE.

Send for Circular and Prices.

F. P. BACON, PRESIDENT

C. L. FOUTS, SECRETARY

THE GLOBE IRON WORKS COMPANY,

Manufacturers and Repairers of all kinds of

Machinery and Iron Castings,

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**LOCOMOTIVES, HOISTING and
MINING MACHINERY,**

Portable, Stationary and Marine Engines

— MANUFACTURERS OF THE —

**DYER CANNON BALL
QUARTZ MILL.**

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STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry All Work Tested and Guaranteed.

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COMPOUND CONDENSING ENGINES,
SHAFTING,

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SELF-FEEDERS,
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STAMPS,
PANS,
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ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

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Successors to PRESCOTT, SCOTT & CO.

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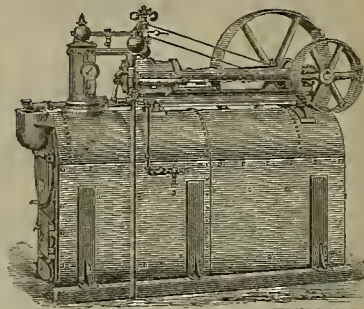
Pacific Screw Fractional and Self-Receding
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Automatic and Slide-Valve Engines,
STATIONARY AND PORTABLE BOILERS

... AND ...

General Sawmill Machinery.



SOLE AGENTS FOR THE

Skinner & Wood Celebrated Portable,
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Engines and Boilers,

5 to 25 Horse Power.

Unequaled for Simplicity, Safety and Effective Steam-
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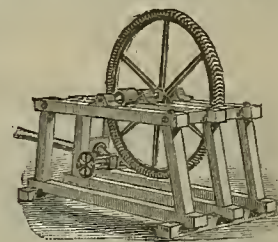
The PACIFIC WATER JACKET SMELTERS embrace
many features that are entirely new and of great practical
utility, which are covered by letters patent.
No other furnaces can compare with these for dura-
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MORE THAN ONE HUNDRED of them are now runs
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obtained as regards continuous running, economy of
fuel, grade and quality of bullion produced. We are
prepared to demonstrate by facts the claims here made.

These Smelters are shipped in a complete state, requir-
ing no brick or stone work, except that for the crucible,
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Complete smelting plants made to order of any capacity
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experienced smelters furnished when desired to a upon
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given upon application. Send for circular.

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For Mills, Pumping and Hoisting.

OVER 300 IN USE!

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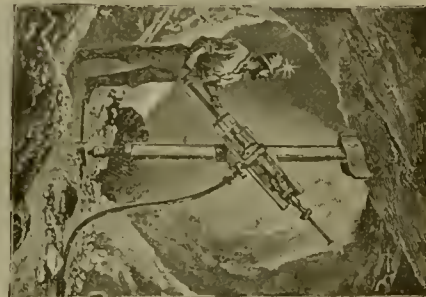
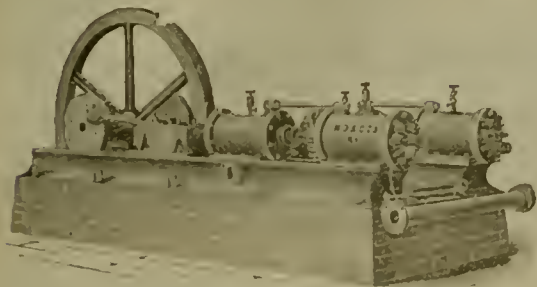
ON SEPTEMBER 1, 1883, I RECEIVED

THE LATEST IMPROVED NATIONAL DRILL,

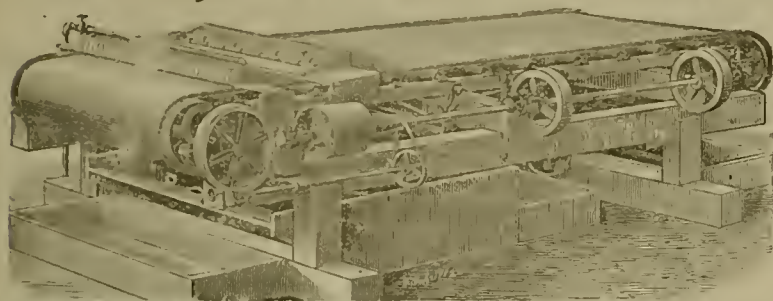
— WHICH —

Anyone, upon examining, will proclaim to be far superior to anything yet offered to the MINING PUBLIC in the shape of a ROCK DRILL.

CALL AND SEE IT OR SEND FOR CIRCULARS.

**\$1,000 CHALLENGE!****PRICE REDUCED,**

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THE FRUE ORE CONCENTRATOR, OR VANNING MACHINE.

OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the office of Hunkley, Spiers & Hayes, No. 220 Fremont Street, San Francisco.

To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.

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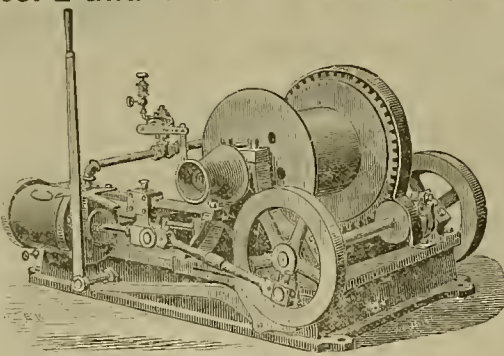
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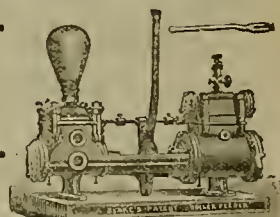
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BLAKE STEAM PUMP.
More Than 16,000 in Use.

**JAS. LEFFEL'S TURBINE WATER WHEEL,**

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

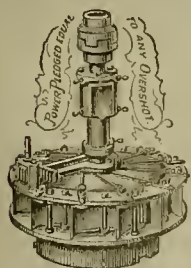
Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power.

Those improving water power should not fail to write us for New Prices, before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

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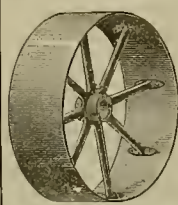
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Stationary and Compound Engines, Flour, Sugar, Quartz and Saw Mills. Amalgamating Machines.

CASTINGS AND FORGINGS OF EVERY DESCRIPTION.

Sole Manufacturers of Kendall's Patent Quartz Mills.



PAT. OCT. 25, 1881.

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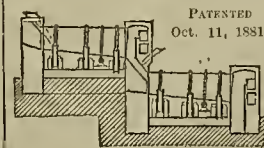
Sole Licensed Manufacturers of the

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For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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NEVIN'S CELEBRATED Patent Ore Roasting and Chloridizing FURNACE.

Working up to 93 per cent. of Fire Assay, using 25 per cent. less salt since July, 1882. **LICENSES FOR USE FOR SALE,** or FURNACES CONSTRUCTED. Address **R. A. NEVIN, Patentee,** JETNA IRON WORKS, 217 Fremont St., San Francisco, Cal

ALL INFRINGEMENTS PROSECUTED.

William Hawkins.

(SUCCESSOR TO HAWKINS & CANTRELL).

MACHINE WORKS.

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Manufacturer of

IMPROVED PORTABLE HOISTING ENGINES.

FOR MINING AND OTHER PURPOSES.

Also of the HAWKINS' PATENT ELEVATOR HOIST, for Hotels, Warehouses and Public Buildings.

Steam Engines and all Kinds of Mill and Mining Machinery.

Mining Machinery Depot, **PARKE & LACY,** 21 and 23 Fremont Street. S. F.

NO. 7 IMPROVED **AIR COMPRESSOR.** **SPECIAL ADVANTAGES.**

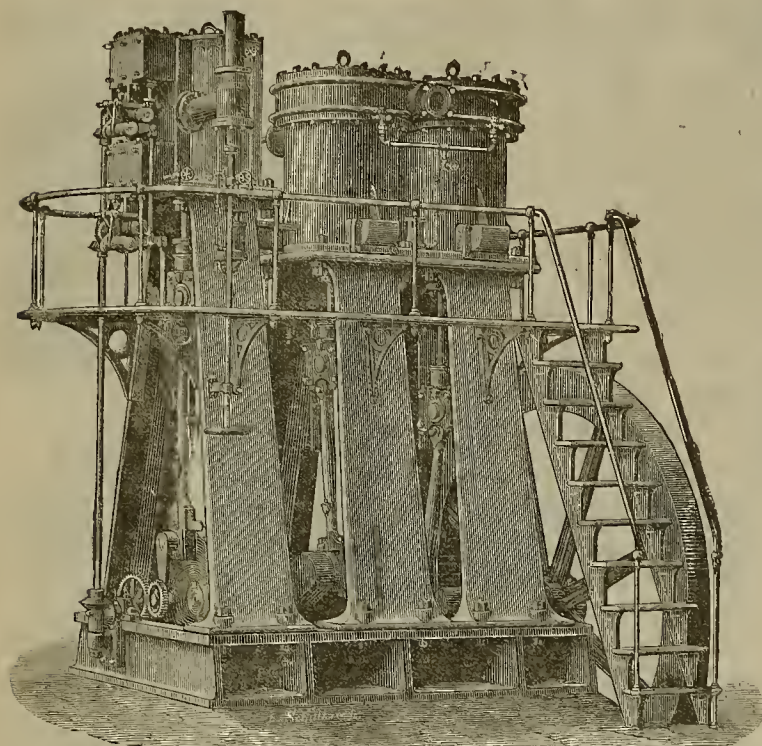
Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

Displacements in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.



With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

WORTHINGTON'S HIGH PRESSURE PUMPS, **COMPOUND, COMPOUND and CONDENSING** **PUMPING ENGINES,**

FOR CITY WATER WORKS.

Special Mining Plunger Pumps, Special Irrigating Pumps, Pumps for all Purposes.

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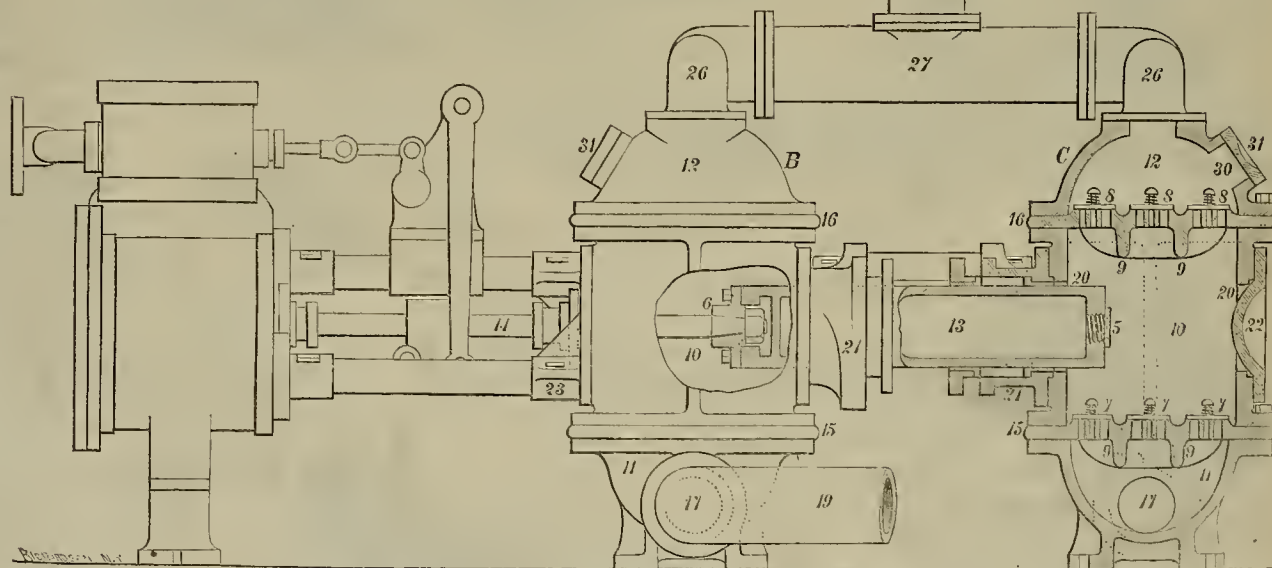
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condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Refining; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value

of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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SAN FRANCISCO, SATURDAY, MARCH 1, 1884.

VOLUME XLVIII
Number 9.

Foundry Notes.

Business at the foundries is generally slack, just now, many of the shops having very little in hand. Until the snow and floods are no more work is kept back, as shipments of machinery to the mountains is now well nigh impossible.

At the Globe Iron Works they have four or five of the Dyer Cannon-ball quartz mills on the list, but will not ship for some time yet. Last season they made quite a number of these mills, among others for the following: S. B. Drury, Iowa City, Placer County, Cal.; Eagle King, G. and S. M. and W. Co., Grizzly Flat, El Dorado County; E. R. Morey, Grizzly Flat, El Dorado County; Thos. Green, French Gulch, Shasta County; J. S. Stillman, Gold Hill, Nevada; B. I. Turman, Gold Hill, Nevada; Thos. Daily, Supt. Bonanza Mine, Grizzly Flat, Cal.; Green & Hauser, Assayers, San Francisco; D. Hagarty, Mineral Park, Idaho; C. J. Rempton, Redding, Shasta County; Chas. Gaily, Fine Gold Gulch, Fresno County; J. Zuckerman, Albany, Oregon; St. Auburn & Co., Redding, Shasta County; Thomas Osborn, Visalia, Fresno County; Wm. Hall, Redding, Shasta County; Galena M. Co., Emigrant Gap; Augustine Schronie, Grizzly Flat, El Dorado County; C. H. Hankins, Grass Valley; Daniel O'Neal, Buckeye, Shasta County; John Richards, Grizzly Flat, El Dorado County; Willard & Weil, Redding, Shasta County; Niagara Mine, French Gulch, Shasta County (Wm. T. Coleman, San Francisco.)

At the Risdon Iron Works, in this city, they have lately imported special machinery for making the Macbeth patent steel pulley, having obtained the right to manufacture for the Pacific coast. These pulleys are less than half the weight of cast iron pulleys. They are polished on the face, are made either crowned or straight, and are turned up on the boss part the same as the best make of cast-iron pulleys. On account of the improved mode of riveting, deep countersinks and large rivet heads may be formed in a thin rim. By this means great lightness is obtained with increased strength. An engraving of this pulley is shown on this page. These pulleys are coming into general use in Great Britain in cotton mills and such manufacturing establishments. Their chief recommendation is their lightness and strength. They possess an additional advantage over most pulleys in that they are turned true in a lathe the same as a cast-iron one.

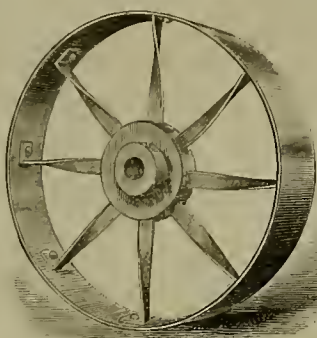
A Flue Covering.

In Mr. Aaron's book on "Leaching Gold and Silver Ores" he describes a very convenient covering for horizontal flues which can be removed and replaced easily. It is shown in the accompanying diagram. It consists of a kind of arched tile made by binding together with an iron clamp as many bricks as may be required by the width of the flue, each tile or section having the length of one brick. The flue is covered with these sections, and the interstices are filled with mortar or a mixture of clay or sand.

GREAT effort is being made to increase the excitement about the Coeur d'Alene mines. Before yielding to the craze and starting for that region men will do well to remember the Stickeen and Frazer river excitements. The Coeur d'Alene country is very barren, cold, and difficult of access.

Water Rights and Mining Claims.

About a year ago a Montana miner who had applied for a patent on a placer claim had his claim rejected by the U. S. Land Office, and appealed it to the Secretary of the Interior. The case showed that after location of the claim in 1871 improvements were made to the value of over \$5,000, consisting of two dams, a tail-race, a supply ditch and a cabin (the latter valued at \$25 only.) The land is (or was) almost wholly

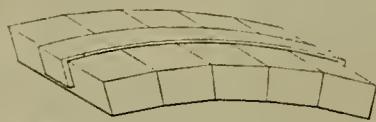


THE MACBETH STEEL PULLEY.

covered by a reservoir of water, leaving but a small portion of exposed land. The original application did not show the discovery of any mineral on the claim: and, although subsequent affidavits showed there is a deposit of gold in the gravel, and, notwithstanding the principal dam was "washed away" in 1876, thus affording opportunity for mining operations since that date, there was no proof that any mineral

Chlorination of Ore.

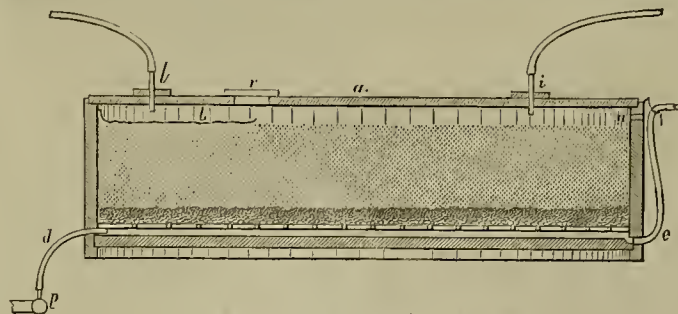
In the chlorination process, after the ore has been properly roasted, it is moistened before being put in the chlorinating vat. After being properly moistened it is sifted to get out lumps and impurities, and also because the more chlorine gas that can be introduced into the ore box or vat the snorer will the chlorination of the gold be affected. It is therefore important to sift the ore directly into the vat in order to



COVERING FOR HORIZONTAL FLUES.

have it therein in as loose a condition as possible. The vats are provided with false bottoms, to prevent leaching and to allow the gas to expand below the whole mass of ore and to ascend uniformly.

The engraving represents a tub filled with ore on a gravel bottom. Over the filter bottom, which is perforated with inch holes, is spread first a layer of clean quartz one and a half to



VAT FOR CHLORINATION OF ORE.

has ever been extracted from the land, or that work has been expended for that purpose. The Secretary of the Interior affirms the original decision in the case, and concurs with the Commissioner of the General Land Office in the opinion that the patent is not in fact sought for a placer claim, but for a water right, and that as such right cannot be patented under a mining claim, the application should be rejected.

A COMPANY has asked Congress for permission to be incorporated as a company under the name of the "Spokane Falls and Coeur d'Alene Railroad Company." The line of the proposed road is from Spokane Falls, Washington Territory, easterly via Coeur d'Alene lake and the Spokane and Coeur d'Alene valleys, with branch lines to several mining districts, the length of which would be about 75 miles. The Coeur d'Alene, Spokane, St. Joseph and St. Mary's rivers and Coeur d'Alene lake contain navigable waters, which could be used in connection with a railroad.

OWING to deep snows and great storms, mining news is somewhat scarce.

more perfectly than the pitch. In either case, however, after a long use, when the vat should be discarded, the staves should be burned and the ashes assayed for gold.

The moistened ore is then sifted into the vat, within about six inches of the rim, as seen in the drawing, leveled carefully, without pressing. The wooden cover, *a*, is laid upon the rim, after a piece of cloth, *b*, has been tacked to the side of the vat near the water pipe, *i*, to prevent the jet of water disturbing the surface of the ore. The pipes, *i* and *l*, before the hose is used, must be closed with stoppers, also the hose, *c*. It is better, in place of the pipe, *i*, to have only a hole into which the hose is inserted when the water is needed. The chlorine gas can be admitted now into the impregnating vat.

Precipitation of Gold.

Comparing the processes of precipitation of gold, the first by the ferrous sulphate in an acid solution of the tetrachloride of gold, is in its manipulations simple, and, in case the solution of the tetrachloride of gold is free from chlorine, bromine, hypochlorites of lime, magnesia, soda and free nitric acid, etc., is complete. But this need not be the case in the chlorination leach-brines; they may contain not only chlorine in an absorbed state, but also a series of tetrachloride and hypochlorites of alkalis and alkaline earths, which may cause an incomplete precipitation; while on the other side the leaches of pure gold quartz not containing magnesia or lime will be precipitated entirely by the ferrous sulphate. The protochloride of iron will do it as well, but it is more costly and very liable to decompose, and cannot be transported in packs or wooden cases, but in jars of porcelain or glass; nor can it be utilized as a by-product of mining process, but must be manufactured by dissolution of pure iron in muriatic acid.

The second process, by the sulphuretted hydrogen, is in its execution more complicated, an apparatus to develop the sulphuretted hydrogen being necessary, and a temperature of 50 to 60° C. But this process can be brought in use in all cases where the gold containing liquids are not pure and do not contain copper even in small quantities. The advantages of this process is that in a warmer solution the precipitation is rapid, and that after reducing all oxydizing compounds in an excess of the sulphuretted hydrogen the precipitate settles quickly, and may be separated from the liquid at once and completely without loss of time or gold.

Referring to a late correspondence in the PRESS between Mr. Aaron and Mr. Bowles it is difficult to understand what advantage would arise in case the sulphide of copper would decompose the chloride of gold, separating pure gold, and washing the mixture of copper sulphide and gold with a new gold solution. From a practical point, certainly none; as it is not ascertained whether this decomposition goes on quickly or complete; while on the other side the sulphide of gold, by a simple refining process, may be separated and purified. The suggestion indicated by Mr. Aaron in his last letter, to let only an imperfect saturation of sulphuretted take place, depending on the supposition that some sulphide of copper which has been formed by sulphuretted hydrogen would reduce the tetrachloride of gold, is hazardous, and the best plan will always be to precipitate the gold in the form of a sulphide by a perfect saturation and a considerable excess of sulphuretted hydrogen.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents. —Eos.

Bodie.

[From our Traveling Correspondent.]

The Bodie Tunnel

Mill and Mining Company is under the superintendence of Thos. Buckley. The 15-stamp mill started up a few weeks since. The Bodie tunnel mine and mill now employs about 30 men. Pulp assays average \$18.50. They have a well defined ledge, about 2 to 2½ feet thick. They opened on the 200 and 300 level another ledge adjoining and east of this, and on that have openings on 200, 300 and 400 levels, and on all these levels have good pay ore. The tunnel has cut in all 21 veins, large and small, that are located and claimed, but some have not yet been prospected further than being cut by the tunnel. One year's supply of ore is now claimed to be in sight, ready to be stoped out. The bullion carries so much gold as to rate at \$8 to \$10 per ounce. The mill and mine seems admirably located, and the mill very conveniently planned. After leaving the agitators, the tailings pass out of mill and through blanket sluices placed under a covered long shed.

I should have mentioned above that considerable of the ore furnished this mill and passing through same tunnel, is from the Bechtel mine, a part of the same group and under the same management.

East of the Bechtel is the Tioga, with the Syndicate to the north and the Standard Consolidated to the south. The Tioga has a shaft about 900 feet deep, with crosscuts exposing large, strong veins, with some pay. The Standard and the Syndicate veins running through Tioga at that point are not so rich as in their own ground. But the Tioga may in further explorations open up a similar rich chimney of ore. To the east of the Champion and Goodshaw is the Dudley, which has been explored extensively, but before the Leut shaft of the Bodie was started they were flooded out, and have not since renewed work. Found rich ore pockets in their tunnels.

The Syndicate mine is in better shape for paying business than it has been in five years. It is now paying dividends, and looks favorable for continuance of same for time to come.

There is a very convenient and economical arrangement. The tunnel and covered trackway runs the ore car direct to the mill without any exposure to the weather or labor of rehauling the ore or hauling expenses. All their ore bodies yet worked are above the tunnel level, and are growing richer and more plentiful, as the bullion production shows.

The Standard Con.

The adjoining mine to the north (and under the same management) had at the same melting a single bar worth \$16,935.40, worth \$7.34 per oz.; the gold being of \$14,927.95 value, and silver \$2,007.46 and a small bar of low-grade bullion \$99.92, scraped from the copper plates. This gives an aggregate of \$27,689.87, which is not a bad output for one week from 30 stamps in the depth of winter, when the snow was deep and cold intense, the altitude of this place being a little greater than the top of Mount Davidson at Virginia City, or somewhere near 10,000 feet above sea level. This Standard Con. mine is spoken of by some very good experienced judges as one of the most promising mines of this whole belt. It measures 1500 feet by 1200 feet wide with patent title, has excellent machinery including air compressor and a steam saw cutting off and tenoning. Their mining timber, which is a marvel to all who see it operate, can do the work of many men and cut everything with great exactness. This mine has a tunnel connecting with the Bulwer Standard mill, and delivers ore direct in the mill at small cost; and a Hallidie, San Francisco, elevated wire tramway to carry the ore to the Standard mill, which reduces the cost of transportation to a few cents per ton, and is not interfered with by all great snow storms. It works automatically and very perfect, as it has been doing for the past five years, delivering during the daytime 63 to 75 tons to the mill. I was favored by the Superintendent, Mr. William A. Irwin, with the privilege of an inside inspection of this great mine, which some choose to call the backbone of this district. Others say "when you see this you see a mine," etc.—were the style of remarks made by disinterested parties.

The Bulwer Company is half owner in the Bulwer Standard mill of 40 stamps. At present the Bulwer has leased its half to the Standard. The Bodie Tunnel Company is now running out better grade ore than formerly to their 20-stamp mill, and making good results except some slight scarcity of water by temporary stopping of the pump at the Leut Shaft—the source of their water supply. They are running about \$20 ore—principally gold.

The Mono mine, lying south and adjoining the Bodie—heing the southern 750 feet of the original location of Bodie, which was segregated from Bodie.

The Present Bonanza Ledge

In the Bodie, was discovered first in the Mono three or four years ago; but at the point of cross cutting the ledge, they found it about six feet thick with the same kind of silver ore as is now found in the Bonanza, and some choice ores assaying thousands of dollars. They were obliged to relinquish work because they had

not machinery capable of lifting all the water of the hill, as the Bodie-Leut shaft, in conjunction with Mono, had not yet been started. Since then the Bonanza, having been found in the same vein, accidentally as it were, in the upper workings, gives a new impetus to start up the Old Mono, prospecting on the same lead now proving so fabulously rich.

The next claim adjoining the Mono on the south is the Champion, which has already a large amount of good development work, reaching a depth of about 500 feet. In drifting and crosscutting, some strong veins were cut, but holding so much water their machinery proved, as did Mono's, incapable to handle the water, but the machinery now will be ample, considering so many other works are draining the belt. Very recently the Champion Co. has elected as Superintendent Charles White, former foreman and discoverer of the bonanza in the Bodie mine, evidently with a high hope that he may be able to strike the continuation of the same belt of veins carrying these rich ore bodies. His starting up in the midst of snow storms, unusually severe, in an energetic manner, gives the community a large expectation that he will succeed in the desired expectations. He has already readjusted the machinery, and has a force of men below, repairing the underground securities. He seems very popular with the business men and miners.

The Goodshaw

Is the next south adjoining ground; Capt. Buckley is Superintendent of this mine as well as of the Bodie Tunnel mine and mill. This mine has works like the Champion, with hoist and pumps, and will no doubt, as early as convenient, start up operations again. Considering the record this property had years ago, in finding rich gold veins, which caused the mine to fluctuate on the stock market from \$1 to \$6, the prospect for rich ore is excellent, during the efficient management of this same superintendent.

The Addenda Mine.

Also the Oro, next on the south, each have good hoisting machinery, and are explored to the depth of 600 feet and 700 feet. These claims occupy the same belt which is here again more elevated, and assumed the title of Silver Mill. The veins in those mines are very similar to each other, carrying principally silver ores as rich silver and sulphides of silver, and the Oro mine has now about 500 tons of milling ore on dump, assay value of \$40 to \$50 per ton, being second-class ore, the first-class averaging over \$500, having been shipped and worked in San Francisco.

The Addenda has also considerable ore out, averaging about the same as that on the Oro dump.

Next south is the Concordia, with ore very similar with the last mentioned mines, the exploration having been done from the Red Cloud shaft, and it is reported they have found very good ore, but yet unexplored on account of the stoppage of Red Cloud's works by the pending litigation on the Red Cloud and Noonday mines. (This Noonday and Red Cloud group consists of different locations). In connection with these mines is the Noonday mill, which has been run some years from ores of the Noonday mine, taking out many hundreds of thousands of dollars in bullion. Haggin and Tevis, of San Francisco, are heavy owners in this property. Mr. Davis, of S. P. C. R. R., figures in the same now.

Other Mines.

Next adjoining, south, are the Maryland Con. and University, parallel location works, on Queen Bee Hill, with shafts down 500 to 600 feet, encountering some good ore. The Maryland Con. is now owned by a German company, with their representatives here to start up mining at an early date.

On the south of Maryland and partly parallel, is the El Dorado, which is at the south slope of Silver Hill.

They have a shaft down 150 feet with several drifts amounting to 100 feet to reach the ledge wall, the ledge being about 20 feet thick. There were several tons of rich ore taken out from this shaft. They are still exploring and taking out some good high-grade ore.

Beyond this is the Victor (with hoisting works) and other locations, but none of them at present are in operation. The Belvidere mine is now being worked under a six months' lease by Warren R. Lose, who is working six men stoping out ore, but for the present leaving it in the mine till ready to work it.

In the Mine.

We went down to the 400 foot level where the main vein lies, 180 feet east of main shaft; from this point we followed the vein 600 feet to the north of the main east crosscut. This crosscut is near the center of the claim. The vein as we followed it is considered 25 feet thick, all pay ore (except a few small horses) is milled. The main east crosscut up to the surface is worked out, but on the south there is a large amount not yet stoped out from the upper levels, and from this 400 foot level to the 500 foot not yet stoped out except about 200 feet, where the vein still holds out in size and about the same in grade.

On the 500 foot level are very extensive drifts on the veins, affording very extensive stoppings ready for the taking out of vast millions of tons, or seeming possibilities for that, in the pursuance of this giant vein, as the two winzes from the 500, at different points down 80 feet, show no depreciation of quality.

To go through all the workings of this mine,

on the different levels, would require, I am told, 24 hours steady moving.

Their main shaft is down to 1200-foot level which is now not being run as they do not care to handle the water at that depth now, as they have ample scope for years working above that. On the 700-foot level they are now making uprisings to connect with the 80-foot winzes of the 500 level for ventilation and exploration. These are each in ore of uniform paying character. On the 1000-foot level they are drifting north and south on the ledge, but have not crossed it to know its size. This appears to be a mine, and for this the bullion product has testified, as published a few weeks since in the Press.

The Late Dr. Eng Imann.

Death of a Celebrated Botanist.

At the last meeting of the California Academy of Sciences, Rev. E. L. Greene read the following:

The venerable and celebrated botanist, Dr. Geo. Engelmann, departed this life at his residence in the city of St. Louis, on the evening of the 4th of this month, at the age of 75 years and 2 days.

He was born at Frankfurt on the Main, and received the first rudiments of his education in the schools of that city. It was there also that, in intercourse with many persons of eminent attainments in natural history, he received his first impulses in the direction of botany. In the spring of 1827, at the age of 18 years, he entered the University of Heidelberg, where, with marked success, he pursued medical studies, giving special attention to botany and chemistry, being associated with L. Agassiz, A. Braun, C. Schimper, all of whom were destined to world-wide renown, the first in zoology and the last two in botany.

In the autumn of 1828 he went to Berlin, where, for two years, he devoted himself exclusively to the study of medicine. He was then, by Prof. Schölein, attracted to Würzburg, where he took the degree of M. D. in 1831. The next year was spent in Paris, still pursuing medical studies and completing his professional education.

At about this period the socialist Duden had created a sensation among the better educated of the malcontents of Germany by his thrilling and seductive descriptions of frontier life in Missouri.

The young physician and naturalist soon after set forth across the Atlantic, and arrived in St. Louis in February, 1833. Taking up an abode with relatives who had already settled there, he devoted the first two years of his residence to acquainting himself with the manners and customs of the frontier. Later he traveled on horseback southward into Arkansas and the Indian territory, returning to St. Louis at the end of 1835, and engaging in the practice of medicine.

As a naturalist he was deeply interested in all those exploring expeditions which were dispatched from St. Louis between 1840-1850.

He was the special friend of Nicollet and Fremont, those ardent explorers of the then almost unknown world of the upper Missouri and Mississippi regions.

From the date of his arrival upon the banks of the Mississippi he began those studies upon North American botany in which he was destined to achieve such high distinction. He also began, and for nearly half a century continued, a meteorological record of the region of St. Louis.

As early as 1836 he made an effort to organize a society of naturalists in his adopted city, proposing for it the name of the Western Academy of Sciences. The movement was premature, and it was not until twenty years afterwards that the Academy of Sciences of St. Louis was organized, of which he was the first president, also filling that honorable seat during many succeeding terms, and enriching the Academy's proceedings from time to time with his masterly monographs.

Other scientific organizations at home and abroad were forward in honoring him with elections to membership. Among them we may name the following: The Natural History societies in Mainz, Freiburg, Hamburg and Vienna, the Academy of Science of Philadelphia, the Lyceum of New York, the Society of Arts in Boston, the Philosophical Society of Philadelphia and the National Academy at Washington and the Linnean Society in London. On the first appearance of his earlier contributions to North American botany, Robert Brown, at that time the first of living authorities, expressed himself amazed at the appearance of such botanical erudition from the west side of the Mississippi in America. In both the natural and acquired abilities of a great systematic botanist it is safe to say that Dr. Engelmann was second to none who lived contemporaneously with him on our side of the Atlantic at least. If he has left behind him no ponderous volumes of standard works, it has been because his life was chiefly devoted to the duties of the medical profession.

Botany (in which he accomplished, after all, so very much that it is chiefly as a botanist that his fame will be immortal), was only his recreation—his pastime when each day's professional labor was ended. But his recreations bore every mark of close, careful and conscientious investigation and the most consummate scholarship. No botanical author of our time was farther from being a mere smatterer; indeed, the works of no other whom we can name bear the impress of so high a degree of discrimination and such thorough and patient study.

Whenever to any of us, his pupils and correspondents, it became known that Dr. Engelmann had taken in hand the monographing of any particular genus, we were always accustomed to say to ourselves that whenever the monograph came out we should have the best possible work on the subject. His masterly power displayed itself in the selection he made of the genera to be treated.

For thirty or forty years past he has distinguished himself by taking in hand such subjects as the other great botanists of America have seemed afraid to lay hold upon.

If there is one North American Natural Order more difficult of treatment than all others, it must be the Cactaceae of our southern and southwestern territories. In this order, Dr. Englemann was the only man who did anything. Of all the species of the cactaceae Dr. Englemann is the author. I doubt if there is one exception, except Nuttall, who was of an earlier generation of botanists, and to whom, moreover, of such knotty genera as *Juncus*, *Cuscuta*, *Isocetes* and several more, now that Dr. Englemann is departed, whom we can appeal to as knowing or claiming to know anything about them?

All of his contemporaries, the most distinguished and able not excepted, were glad to turn over to Dr. Englemann's treatment, every genus which he expressed a willingness to take in hand; and none were found who could criticize his work when done.

During the later years of his life, after having retired from the practice of his profession, he made several trips to the Rocky mountains and westward, having given himself to the study of the oaks, pines, spruces, cedars and other forest tree genera, which were greatly in need of thorough and careful study. One of these excursions was extended to this coast. He passed some time in the Sierras and along our shores, in the summer and autumn of 1880.

His main object in coming was to learn more about our oaks and pines, in which he had long been specially interested.

He remarked, half jestingly, on this floor, that he had supposed, formerly, that he knew something about our Pacific coast oaks (though they are a most difficult family to handle scientifically), but he said that after having seen them in their native haunts, and noted their almost countless forms, he began to think that he knew very little about them.

Numerous genera in our volumes of the Botanical California have been elaborated by him. His work upon the cactaceae, oaks, pines and spruces, be did not consider at all complete. He only professed to give us the best elucidation of the species, which our collected materials, enlightened by his own, necessarily limited personal observations rendered possible.

When, last summer, we heard that he was ill in Heidelberg, we who knew his advanced age, thought it probable that he would not be permitted to regain our shores. But he rallied, and came back in good health and spirits, and there seemed reason to hope that more years of his valuable labors would be vouchsafed us.

Suddenly, now, he has fallen asleep. He has been gathered to his fathers; his work is done; and yet not done, for no man's work, who wrought with zeal, and care, and diligence and perseverance like his own, is ever, to his own thinking, done.

Yet who, among ourselves, we can but ask, shall be found worthy to complete what he has left unfinished?

Note.—That portion of the above sketch which relates to Dr. Englemann's early life, was translated from a German newspaper, by Dr. H. H. Behr.

An Important Find.

About one month ago an important discovery was made by Samuel Carson, on his land at Tejuanga, about twenty-five miles from this city. The peculiar character of the mineral attracted his attention, and upon investigation it was found to be graphite of a superior quality. Specimens were brought to town, and resulted in A. W. Potts, A. M. Reed and Wm. Osborn becoming interested in the mine, and work actually proceeded with. A tunnel is being run so as to cut the ledge, and the results produced are beyond the most sanguine expectations of the owners. The ledge is estimated to be forty-two feet wide, and can be traced a considerable length by the croppings. The mineral is taken out in an almost pure state, is easily worked, and is destined to be in considerable demand as soon as its merits are brought to the attention of manufacturers. Mr. Potts sent a specimen to Dallas, Texas, and an answer in reply stated that it was the best article of graphite that had ever been received at the factory there. It is the intention of the owners to send a huge specimen to Faber & Co., the great manufacturers of lead pencils, and if the article is what it is supposed to be, and is considered favorably by that firm, regular shipments will be made to them. The mine is only twelve miles from the railroad, and will, in the course of time, prove to be a great property. Besides being used in the manufacture of lead pencils, paints and stove polish, it has been demonstrated that it has no superior as a lubricator for machinery, and had been successfully tried in mills in this city.—Los Angeles Times.

MECHANICAL PROGRESS.

Welding Properties of Different Irons.

We find in the *Annals de l'acier* a very interesting article by M. Ledebur, professor at the Friedberg School of Mines, on the relations which exist between the purity of iron and its welding. Compared with metallic alloys, iron mixed with foreign bodies presents, from the point of view of physical properties, very close analogies. Every alloy of two metals gives a harder composition, with greater power of resistance, than either of the metals taken singly, but malleability diminishes and brittleness increases. With regard to points of fusion, it is known that the point of fusion of an alloy is always below the mean of the points of fusion of the metals of which it is composed, and often even inferior to that of the most fusible. In the case of iron, all these phenomena are produced with the greatest exactness; if, for instance, carbon be combined with iron, the hardness and brittleness augment; the resistance, which increases at first, rapidly obtains a maximum and then diminishes. When two pieces of iron can be united in one by pressure at a certain temperature, it is said that the iron is weldable. To accomplish this, the iron must pass into a state of softness and a pasty consistency, which favors the union of the molecules when accompanied by pressure, and more progressively this passage from the solid to the liquid state is made, the more capable is the substance of being welded. Thus, decarbonized iron is generally more malleable than steel, which is but little so, and than pig, which is not at all so. When the proportion of carbon with the iron augments, the point of fusion of the metal obtained diminishes, and the hardness and brittleness increase, but as the time for passing from the solid to the liquid state diminishes, it follows that the welding is performed with less ease.

Soft cast iron is always much less weldable than forge iron properly so called. According to M. Ledebur, who divides in categories the various shades of soft metal, we ought to understand by "weldable" that which is so with or without precautions, and by being not weldable, that which welds badly or does not weld at all. It seems to result from the investigations of M. Ledebur that the sum total of foreign bodies in soft non-weldable metal is about 70 per cent above that which is in weldable steel. After having occupied ourselves with the carbon, and having indicated that to obtain a good welding it is necessary that the iron should contain a small quantity of this substance, much below 1 per cent, we proceed to pass in review the influence which other bodies generally found in the iron have on welding. With regard to silicon it is desirable that the iron should contain a small quantity, though its influence is less than that of carbon. The influence of phosphorus is rather advantageous in puddled iron from the point of view of welding. On the contrary, in soft cast iron it seems that phosphorus may be disadvantageous. If we remember that with an equal quantity of phosphorus puddled iron is poorer in other foreign bodies, particularly carbon, than soft steel, since the less carbon there is in the iron the less influence foreign bodies have, we shall perhaps find the most plausible explanation of this practically undeniable fact.

With regard to manganese, it is probable that its presence in the iron is more injurious than advantageous to welding. The following are the conclusions arrived at by M. Ledebur: (1) The purer the metal is the easier it is to weld; (2) phosphorus is more troublesome to steel than to puddled iron; (3) manganese, silicon and carbon are obstacles to welding; (4) a proportion of oxygen not reaching .07 per cent has not the same influence over the welding of steel as an equal quantity of manganese, silicon and phosphorus.

MACHINERY AND THE HAND.—It has taken years of improvement to make headway against the strange notion that improved machinery and mechanical processes work against the workman. It has been the cry at every new step in advance that it would be the death-blow to some industry formerly carried on by hand. The locomotive was to do away with teaming. The sewing machine was to be a foul crime against the welfare of the seamstress. The reaper and mower were to interfere with the rights of the sturdy swathe-cutters of the farms. In short, every such advance has been met by just such objections. Yet there is less poverty, less squalor, less ignorance and less idleness among the laboring classes in our age, which is the age of invention, and in our land, the land of inventive genius, than in any other age or land the world has ever known. Milling processes have been so lately and so rapidly improved that they have suffered less obstruction than many others. Still there has been a vast amount of very foolish talk about this branch of trade, and there still is. Yet not the least valuable effect of modern mechanical improvement has been the broadening of the ideas and the general improvement of mind it has brought to that very conservative class of men, the millers. The almost incredible opposition suffered by Oliver Evans would be an impossibility in 1883, and we may view this fact with satisfaction as

indicating the enlightened condition of the present generation of millers.—*Roller Mill.*

POUNDED CAUSED BY CHANGING VALVE MOTIONS.—Many engineers alter their valve motions and thereafter have trouble from pounding. Engines which ran silently, so far as pounding was concerned, begin to protest against the new condition of things so soon as the times of the valves are changed. This is to be expected, but of the two evils, waste or noise, the latter is the least; that is to say, if cards show that steam is being used wastefully, and corrections are made, it is natural that an engine should pound, and for this reason. The bearings and connections are all worn to suit the old state of things. Wherever the greatest pressure came before the valves were altered there the greatest wear will be found. Change the times of the valves and the greatest pressures come at another point in the stroke, earlier or later, as the case may be, and the result is thumping. This is one cause of unpopularity of taking off compression of the exhaust from an engine. So soon as this is done in an engine which has always run under a high degree of compression it pounds badly, and the engineer says it was just what he expected, and that an engine can not be run without compression, and run silently. The troubles in such a case, as we have mentioned, lie not in the want of a cushion for the piston to bring up, but in the bearings and connections. These should all be bored out and refitted where compression is taken off, and, probably, the crank pin tried up. Among the leading high-speed engine builders, the amount of compression is decreasing rapidly. Cards before us from four of the largest concerns, makers of 700 to 800 H. P. engines, show from very slight to none whatever.—*Mechanical Engineer.*

BUILT UP WOOD. A very strong and durable material is constructed in the following manner: Several thin sheets of veneers, an eighth of an inch thick are glued one upon another, with the grain of each sheet crossing the grain of the sheet next above or below it at right angles; and, when the whole complex fabric has lost all power of resistance through being almost saturated with steaming glue, it is pressed into an almost homogeneous board without any cleavage whatever, and so without possibility of splitting. Every sort of wood, of course, can be built up. The inside layers can be cheap and the outside choice. No matter whether or not the different sheets naturally swell and shrink evenly together. They are too thin to exert much force. Their separate identities are lost in the common and overmastering union. The advantages of economy, strength in every direction, and immunity from cracking are enough to give the fabric the readiest possible acceptance for whatever uses in may be adapted. It is already in use for broad, flat surfaces in cabinet work, especially where strength or permanence is wanted. It already competes with canvas for the use of artists, and with binders' board for book covers. Its availability for any purpose appears to be a matter of expense and skill—never of quality. That it will be adapted to many uses not now thought of is as sure as the inventive fertility of our mechanics.

MECHANICS WHO RISE.—There is a large sized nugget of truth in this from Dr. J. M. Buckley's series of "Letters to Young Men": "Benjamin Franklin told the truth when he said that the best knowledge a man could give to his son was the mastery of a good trade. Such a man is a cosmopolitan. He can make himself useful anywhere, and he can live anywhere. If it should not be necessary always to work at his trade, he feels the ability within to support himself. * * * Between the average mechanic and the great manufacturer or merchant prince great numbers can be found who began as mechanics and who have taken positions by their mechanical skill fully equal to that of the average merchant and far superior to that of most clerks and professional men. * * * Always have in view rising above the position of a mere journeyman. Look at things from a broad business point of view. Consider that some day you may not be a journeyman, and try to study the relations of capital to labor and to master the principles of business, so that if you should ever form a partnership with a business man you will not be at his mercy, and so that, if you choose, you may at any time enter upon business for yourself, and not fritter away your life in a vain effort to overcome by mechanical skill financial obstacles." Every young mechanic should cut out the above extract and tuck it up over his bench. It is too good to be lost.

AN IMPROVED CANNON.—At the French gun factory near Lille has recently been finished a cannon which presents some peculiarities of proportion and shape, but whose chief novelty is a compact wrapping of fine wire around it as tightly as possible by an engine constructed for the purpose. Preliminary tests have shown that the resisting strength of the gun metal is more largely increased by this device than it could be from an equal weight of similar metal cast with the tube itself; but whether or not the wire will stand the strain of continued use can only be decided by the severer tests which are now about to be applied.

SCIENTIFIC PROGRESS.

What is Electricity?

Electricity is the most stupendous force in nature, apparently active throughout the universe, the cause of the phenomena described as attraction, gravitation and magnetism, and most probably of heat and light. It is incessantly active, and maintains, it would seem, the physical life of the world. Science can only appreciate some of its results, and apply it on a very limited scale to practical purposes; but knowledge of its adaptability is growing every day, and what a few years since was little more than material for brilliant laboratory experiments or the production of scientific toys, is now becoming a gigantic motive power available for the service of practical science and the progress of civilization.

Already it provides a means of instantaneous communication between portions of the earth's surface, most remote from each other. It is gradually superseding all other methods of artificial illumination, and it promises to make steam obsolete as a motive power. What other aid it may give, we know not, and we scarcely dare conjecture, although it would seem that the most vivid imagination must fail to apprehend its possibilities. It is in the earth beneath us, known as terrestrial magnetism; it is in the atmosphere around us, and its energy is seen in the lightning flashes which mark the discharge of force between clouds, each of which is a storage of force; and in the vast, indeed inconceivable, kosmos, electricity maintains the relations of suns and systems moving with enormous velocity and unvarying regularity through space. It is a force which, so far as human intellect can appreciate it, knows no cessation, diminution or deterioration. It can be summoned but not created by any skill of man—made apparent in the results of friction or chemical action, but made apparent only, not produced. A spark the eighth of an inch long, produced by contact with the small electric machine in the lecture room is precisely similar in character to the terrible flash which splits a tree to fragments, striking it with sudden death, or topples down the most massive tower reared by the skill of man. In Oriental fable, we read of lamps, the rubbing of which produced an obedient genius ready to minister to every wish. We can excite the electric force, and the most stupendous of all the genii nature—if not, indeed, the master-spirit, of which all known natural forces are but variations—is at our service; our servant, if we will—our most terrible master if we have no skill to conciliate him.—*Beeton's Dictionary of Science.*

THE WESTERN MOUNDS.—More than usual attention is now being given to opening and preserving the contents of the earth-mounds which are so plentifully scattered throughout the Western and Middle States. Professor Norris, the ethnologist, who has been examining mounds in West Virginia for several months, recently opened a large mound six or eight miles from Charleston. The *Call* of that city says: "This is the largest mound in the valley, and proved a rich store-house. The mound is fifty feet high, and they dug down to the bottom. It was evidently the burial place of a noted chief, who had been interred with unusual honors. At the bottom they found the bones of a human being, measuring seven feet in length, and nineteen inches across the shoulders. He was lying flat, and at either side, lying at an angle of about forty-five degrees, with their feet pointing toward their chief, were other men—on one side two and the other three. At the end of the chief lay another man, with his hands extended before him; bearing two bracelets of copper. On each side of the chief's wrists were six copper bracelets, while a looking-glass of mica lay at his shoulder and a gorget of copper rested on his breast. Four copper bracelets were under his head, with an arrow in the center. A house twelve feet in diameter and ten feet high, with a ridge-pole one foot in diameter had been erected over them, and the whole covered by the dirt that formed the mound. Each of the men buried there had been inclosed in a bark coffin."

COLORS OF LEAVES AND FLOWERS.—Though the colors of leaves and flowers depend on light, the process of coloring is a vital one, and, like all exhibitions of vital power, depend directly on nutrition. It has been shown by observers in our own country that even the color of autumn leaves cannot be examined without taking nutrition into consideration. The colors of flowers in high latitudes, as compared with those of the same flowers of lower elevations, are higher, simply because of variable drains on nutrition. Professor Henshaw has recently reverted to this peculiar relation of light to nutrition in the colors of flowers by comparing the common lilac and the hyacinth. If the purple variety of the former be made to bloom in darkness it becomes wholly white, but the purple or other colored hyacinth retains much of its color when made to bloom in the dark. The reason is presumed to be that the flowers of the lilac

as they develop have to perfect nutrition from the atmosphere, which they cannot do without the aid of light, while in the case of the hyacinth it has been fully perfected and stored up in the bulb the season before. This is equivalent to saying that the bulb can go on growing in a much more nearly perfect manner without light than the lilac can.

A NEW SOUNDING LEAD.—An ingenious sounding lead, enabling the determination of the exact moment of its arrival at the bottom, by means of an electric-alarm bell, is described in a recent issue of *London Engineering*. The sounding line, as there stated, is in reality a cable containing two wires, which form the circuit of the bell. It is attached to the ring of the lead at one end, and to the hauling winch on board ship at the other. The lead itself consists of two parts, the lower being hung from the upper by four stems which slide in mortise grooves cut in the sides of the upper part. Its bottom is furnished with the usual hole, containing tallow to catch specimens off the bottom. The upper part of the lead, which hangs from the line by the hook already mentioned, is a heavy mass of lead, and a hollow through its interior contains an electric contact terminating the ends of the two conductors of the cable. This contact is closed by a stem or plunger attached to the lower movable part of the lead. When the lead strikes the bottom the plunger is driven up the hollow in the upper lead, and establishes contact between the ends of the two conductors, thereby completing the circuit of the bell, which immediately rings on board the vessel, indicating that the bottom has been reached. The contrivance, as will be seen, embodies several points of interest, and may perhaps prove of some value in more accurately determining depths than has thus far been the case.

A WHITE RAINBOW.—On the morning of November 28th, at 9:41 o'clock, Paris time, M. Cornu, the French astronomer, observed at Courtenay (Loiret) that rare phenomenon, a white rainbow, an account of which he has lately furnished to the French Academy of Sciences. The sun, which was very pale, rose in the midst of level bands of cloud. A thick, hoar frost covered the ground, and a light fog thinly veiled the sky, which was clear of clouds toward the zenith. Opposite the sun a great white arc without a trace of iridescence was figured on the fog.

ATTRACTION AND REPULSION OF BODIES IN MOTION.—The attraction of a light balanced body to a vibrating tuning fork was shown in a recent lecture in New York by Dr. Monkmann; also the attraction between two disks of paper revolving parallel and in the same direction. The lecturer also showed that two smoke or steam rings, traveling abreast and in the same direction, attract each other; also, that two paper rings, revolving in the same direction, attract each other when moving close together, while if they revolved in opposite directions they repel each other.

CAUSE OF THE ISCHIA DISASTER.—The volcanoes have a good deal of business put upon them just now, between earth and sky, but it is doubted in well informed quarters if the disaster at Casamaccia was at all due to volcanic agency. It is said that the delicate apparatus on Mount Vesuvius, which is arranged to give warning of any change in the stability of the surface, showed no signs of any perturbation. The newer, and apparently better founded theory is, that the ground was undermined by the action of hot springs, and that the town stood upon a mere crust of earth, which gave way at the time of the disaster.

ALCOHOL IN A BUSHEL OF GRAIN.—Corn affords 40 lbs. of spirits of the specific gravity of 0.9427, containing 45 per cent of absolute alcohol for each 100 lbs. of grain; wheat, 40 to 45 lbs. of spirits, barley 40, oats 36, rye 36 to 42, hucklewheat 40. Now 40 lbs. of such spirits equal 3½ gallons of government proof spirits. It is computed that 1,000 gallons of alcohol are evaporated daily, in New York alone, in the baking of bread. A trial to save the alcohol in one case of testing resulted successfully, so far as securing the alcohol, but the bread was made tasteless by the process.

IMPORTANT DISCOVERY IN PHOTOGRAPHY.—E. W. Fellows, Cleveland, Ohio, after experimenting for two years, claims to have succeeded in inventing a way to take instantaneous and absolutely permanent photographs upon anything having a smooth surface, by the action of electricity. The expense is less than one cent for each picture. If all that is here claimed is true, this invention will revolutionize photography.

A NEW STORM INDICATOR.—A French meteorologist has, in the exposed court of his house, two bars of iron planted in the earth, to each of which is fixed a conductor of coated wire, terminating in a telephonic receiver. His practice is to consult the apparatus every day, and it never fails, through its indications of earth currents, to give notice of the approach of a storm twelve to fifteen hours ahead.

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SAN FRANCISCO:

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Passing Events.

We have had phenomenally hot weather for
a week past, for this time of the year, but it
has been good for the country, after the copious
rains. Everything is growing fast and if we have
no bad frosts we are sure of a very good year.

We give considerable space this issue to the
report of the Manufacturers' Association, a new
and growing organization composed of the best
of our citizens. They are in earnest in foster-
ing the home industries of the Coast and will
adopt vigorous measures to protect and en-
courage our manufacturing interests.

The gold fever about the new Idaho fields
increases instead of abating and in a few weeks
thousands will be on their way to Cen-
tral Idaho.

In the Superior Court of Santa Clara county,
Dora A. Bunt and Mary Dora Bunt, by Dora A.
Bunt, guardian *ad litem*, have brought suit
against the Sierra Butte Gold Mining Company
(Limited) of Sierra county. William J. Bunt,
the father and husband of the plaintiffs, was
killed in a tunnel of said company on the 4th
day of October, 1883, while he was working a
drill in said tunnel, he being an employee of
the Sierra Butte G. M. Co. The complaint says
that defendant's servants recklessly, carelessly
and negligently took supporting timbers out
of the tunnel, causing a cave and killing William
J. Bunt. The amount sued for is \$30,000.

Work on the artesian well at Logan (Quijotoa)
continues, and is being pushed as fast as
possible. The number of men at work on the
mines has not been increased, and cannot be
to any great extent for some time to come.
There is no chance to get work in the mines,
but the rush has set in and will not stop till all
who have the Quijotoa fever have reached the
camp and had a look for themselves.

A New Mineral.

A new mineral called "Colemanite" was found
not long since in the southern part of this State,
and named in honor of Wm. T. Coleman, of
this city. It is a hydrous-borate of lime.
There are several minerals of somewhat similar
composition, and its affinities are shown in the
following schedule:

Ulexite.....	2CaO	15.9
	Na ₂ O	8.8
	5B ₂ O ₃	49.7
	10Aq	25.6
Bechillite.....	CaO	20.89
	2B ₂ O ₃	52.24
	4Aq	26.87
Colemanite.....	2CaO	27.18
	3B ₂ O ₃	50.98
	5Aq	21.84
Pandermite.....	2CaO	29.78
	3B ₂ O ₃	55.85
	3Aq	14.36
Priceite.....	3CaO	29.9
	4B ₂ O ₃	49.8
	6Aq	20.3

The clearest crystals obtainable contained
small quantities of soda, varying from 26-100
per cent to 54-100 per cent, reckoned as caustic
soda, but undoubtedly present as borate of soda.
This is probably a mechanical admixture, and
does not enter into the mineral as an
essential element. It points, however, very
strongly to the origin of the mineral from
ulexite. By inspection of the formula, we
observe that if the soda be abstracted from
ulexite along with its equivalent of boric
anhydride (2 B₂O₃), there remains a compound
identical with Colemanite or pandermite in its
ratio of boric acid to the lime. In fact, both
Colemanite and pandermite have been produced
artificially by deposition from aqueous solu-
tions of ulexite, the temperature alone deter-
mining the degree of hydration. Under vary-
ing conditions of temperature, concentration
and pressure different and yet closely allied,
hydrous borates of lime would be deposited,
and this might take place in quick succession
or even simultaneously in different portions of
the same bed or ledge. These borates are thus
very closely allied in their origin, and are
liable to glide one into another by insensible
gradations. Hand specimens are found having
all the appearance of ulexite at one extremity
and Colemanite at the other. This may account
for some of the apparent discrepancies in the
analysis by reputable chemists. Pisan's
analysis of pandermite (quoted by the State
mineralogist), is that of a Priceite pure and
simple.

Specimens of borate of lime having all the
appearance of the massive variety of Colemanite,
have given results, on analysis closely agreeing
with the formula of Priceite.

As far as we are informed, Colemanite is the
first definitely crystallized borate of lime hith-
erto found.

With reference to its susceptibility of reduc-
tion to boric acid or borax, practical tests have
shown it to be quite refractory.

A paper describing this new mineral was
read at the last meeting of the California
Academy of Sciences by J. T. Evans as follows:

COLEMANITE.—Crystallization monoclinic. "In-
clination of the vertical to the clinodiagonal
axis (C) 70° 1' A 1 108°. ii Δ 1 144° ij Δ 1
126°. Lustre vitreous to adamantine, often
splendent. Cleavage ij or clinodiagonal per-
fect, affording readily thin, smooth and polished
laminae which often show interference figures.
Cleavage in other planes imperfect and fracture
uneven, giving surfaces of a subvitreous luster.
Hardness 3.5 in the amorphous to 4.25 in the
crystalline variety. Sp. gravity 2.428. Color-
less, streak white. Transparent, subtranslu-
cent to milky, especially in the massive. Rather
brittle.

Composition, 2CaO, 3B₂O₃ + 5H₂O.
Anhydrous boric acid..... B₂O₃ [50.98]
Lime..... CaO 27.18
Water..... 21.84

Total..... 100.00

Pyr. Decrepitates violently and at length
sinters. With fluor spar and bisulphate of potash,
colors the flame yellowish green. Soluble in
dilute hydrochloric or nitric acid with deposi-
tion of flakes of boric acid in abundance.

Locality, Southern Cal., where it was dis-
covered by R. Nenschwander, October, 1882.
Named after Wm. T. Coleman of San Fran-
cisco.

The notation is conformable to that of Dana's system
of mineralogy.

Natural Cementation of Copper.

Heavily sulphuretted ores of iron and copper
readily undergo decomposition, the sulphur being
oxidized into sulphuric acid, which attacks the
simultaneously oxidized iron and copper, form-
ing soluble sulphates of these two metals.
Under the combined action of heat and mois-
ture the sulphatization takes place actively in
certain mines, the water flowing from which
carries a notable amount of copper. To save
this it is conveyed through tanks filled with
iron, whereby the copper is recovered as metal-
lic precipitate (cement copper). In Europe
many hundreds of tons of copper are precipi-
tated annually from the water flowing from
certain mines. The water from one mine yields
.264 pound of iron and .032 pound of copper
per cubic foot, or .5 per cent of copper. As
there is always a large amount of free sulphuric
acid in these waters, the consumption of iron
is largely in excess of what is required merely
to precipitate the copper. Mr. James Douglas
Jr., says that from a neutral solution 87
parts of iron will precipitate 100 parts of cop-
per, but from the acid liquors of the mine here
referred to, it required, in 1859, 5,598 cwts. of
iron to precipitate 2,153 cwts. of copper, or 260
parts of iron to 100 parts of copper.

This same reaction by which the sulphurets
in mines are being deprived of their copper is
taken advantage of to extract the copper from
iron pyrites low in copper. For instance, at
some mines in Spain and Portugal, large heaps
of fine ore accumulate carrying about two per
cent of copper. These are simply wetted,
preferably by water thrown with violence from
a hose, which carries mechanically some air into
the heaps. As a result, in that warm climate,
disintegration and decomposition proceed so
rapidly that the copper is virtually leached out
from the heaps in about two years and recov-
ered by precipitation on iron. In this country
a very old industry has been the manufacture
of copperas from the crude pyritous ores of the
Copperas Hill, Vt., which are decomposed
slowly even in that cold climate by atmospheric
agency.

The Mineral Land Bill.

The California Mineral Land Indemnity Bill
came up in the U. S. Senate on Tuesday for
final passage. Senator Plumb presented a sub-
stitute for the bill, which he said was the same
as the bill reported from the Committee on Pub-
lic Lands last session. It was designed to com-
pass such points as the bill before the Senate,
but was not, he said, open to the same objections
as the latter, namely, permitting the taking of
a section of land in any part of the State. Sen-
ator Miller said the original bill was intro-
duced by him at the request of the Governor
and Attorney-General of California. It was
not his own measure, therefore, and he had no
objection to the amendment offered by Mr.
Plumb. Garland, of Arkansas, wanted to
amend Plumb's substitute after it had been
read, and was allowed to do so. He moved to
strike out the words "shall be construed as
given," and insert "was intended to give,"
where these words define the object of the origi-
nal granting act. Garland's motion was agreed
to, and the bill passed without debate as
amended by Garland. The bill now reads as
follows:

Be it enacted, etc., that an Act entitled "An
Act to provide for the survey of public lands in
California, the granting of pre-emption rights
therein, and for other purposes," approved
March 3, 1853, was intended to give the State
of California the right to select for such pur-
pose other lands in lieu of such sixteenth and
thirty-sixth sections as may have been or shall
be found to be mineral lands; provided, that
such indemnity sections shall be made under
the limitations contained in said Act from the
public lands of the United States in the State
of California subject to entry under the general
laws, and not mineral nor occupied by actual
settlers, nor reserved for any other purposes,
nor appropriated under any law of the United
States.

FOLLOWING is a specimen of the puffs given
to stations near the Cœur d'Alene country by
papers in that section: "Persons waiting to
buy or lease on speculation have a good oppor-
tunity now, as lots have been sold, and in 24
hours have changed hands at a margin of from
100 to 300 per cent. Belknap is bound to be
a second Denver, and in 60 days will have a
population of 10,000."

DURING the past four days the Denver and
Rio Grande has brought to Salt Lake over five
hundred people from Colorado points. Their
destination is the Cœur d'Alene.

Annual Meeting of the San Francisco Microscopical Society.

The annual meeting of the San Francisco
Microscopical Society was well attended and
considerable interest manifested. Col. C. Mason
Kinne, President, occupied the chair, and
among those present was A. H. Breckenfeld, of
San Francisco, a newly elected resident member.

The President's Address.

The President delivered his annual address,
as follows:

GENTLEMEN:—This meeting closes the twelfth
year of our organization as an earnest, enthusi-
astic and working society. The few of us who
have been with it from the first, can
look back through the several years with
more than pardonable pride, and while it
is a duty devolving on the President to give a
brief statement of the doings of the past year,
it becomes a pleasure when I look beyond the
twelve months and think of what this organiza-
tion has aided to accomplish. As we enter
upon the thirteenth year, the past may be a
safe augury of what our members can do in the
future. The original investigation and personal
research into new fields, of which our State is
so prolific, combined with the study and pro-
mulgation of such facts as naturally pertain to
the microscopical branch of scientific knowledge,
has made a record for the San Francisco Micro-
scopical Society which many of the older socie-
ties point to with satisfaction, and as worthy
of emulation.

As to the record of the past year, it becomes
proper for me, first of all, to say that the unex-
pected resignation of President Ashburner in
May last was regretted by me, not only in the
fact of our being no longer permitted to enjoy
his presence among us, but more personally
from the fact of your taking advantage of my ab-
sence from the next meeting and there throwing
the executive mantle on my shoulders, without
permitting a declination of the honor. My ad-
ministration of four years ago, as President, I
do not feel was so productive of results as to
have warranted such an expression of confi-
dence, except that perhaps my address at the
close of the term was so pointed at your general
ability to do, but personal unwillingness to ac-
complish many of the things that lay before
you, and which would redound to the great ad-
vantage of our association, that possibly I there-
by aided in awakening a little more interest.
Certain it is that of late we have begun to show
some of the old-time spirit, and papers and lec-
tures from meeting to meeting have betokened
a renewed interest in such matters as prop-
erly pertain to a society like ours.

Meetings and Membership.

During the year which closes to-night, we
have held our regular semi-monthly meetings
with a generally good attendance. The num-
ber of visitors attending by invitation has not
only been greater than in many former years,
but they have betokened a bright interest in all
that has come up before us.

We have elected but four resident members
and three have resigned for various good rea-
sons. We have elected two corresponding
members. Mr. C. H. Denison who is now one
of our corresponding members, departed for the
East soon after his resignation as a resident
member, and his regular attendance and fre-
quent papers on various subjects are missed by
us all.

We have lost one member by death—Mr.
Geo. H. Williams. He died quite suddenly and
his unexpected removal from our midst cast a
feeling of sorrow over all. He had been one of
us for some eight years and was always es-
teemed as one of our most earnest and faithful
members, and while not prolific in papers or
lectures, he did good work in a quiet way for
the advancement of all our mutual interests.

Cabinet and Library.

Constant accessions to our cabinet of slides
and general objects have been received, and
besides the periodical microscopical and other
scientific literature, we have acquired by pur-
chase and donation many valuable and instruc-
tive volumes.

This material and palpable increase to our al-
ready large and varied cabinet and library has
been fully equalled by the mental information
given us by the informal discussions at our
meetings of many of the topics naturally within
the range of a society like ours. The exhibition
of a slide prepared at the hands of this or that
member, and the remarks incident to its pre-
sentation, have frequently called out suggestions
and ideas from those present which have result-
ed in the usual spontaneous information, which
arises from imparting one's own experience with
the same or kindred matter.

Added to these impromptu topics, which
ranged from diatoms to cosmic dust, graphi-
ology to ancient mosaics, and algae to accessories,
we have been favored with several

Papers and Lectures

Prepared for the occasion. Mr. Hanks' paper
on "Some Notable Features of the Great Snow-
fall of December 31, 1882, in San Francisco,"
was presented in that gentleman's usual inter-
esting style, with many valuable deductions
from the result of his investigations of the
matter. His careful analysis of the residuum
after evaporating the water, coupled with the
information he gave of sand and dust storms in
various countries, made it one of the best pa-
pers of the year. We trust that his promise to

give us a paper relating to the phenomenal "Sunset Glow" of past months may be speedily fulfilled.

Professor Ashburner, before his departure from among us, favored the society with a valuable lecture on "Angular Aperture," a subject in which he is at home, and was handled in his ready and understanding manner.

The exhibition by Mr. Banks, of "Cole's Studies in Microscopical Science," was productive of a request that he illustrate the same with the microscope, which he did at the next meeting with an array of seven of our favorite instruments. Mr. Banks' earnestness and never-failing attendance at our meetings is worthy of being copied by those of our members who can do something, but accomplish little in the way of keeping up the *esprit de corps* of our gatherings.

Vice-President Norris has pursued his favorite occupation of cleaning and mounting the delicate diatom and we have been favored with his production and remarks regarding their preparation, on various occasions.

Dr. Behr responded to our request in the matter, with a paper giving a technical description and identification of an insect of the genus *Matilla*, besides much information at various times of subjects entomological.

The valued accession to our ranks last year of Dr. Sternerberg, U. S. A., has fully warranted our faith that it would be good to have him among us. At stated periods he has addressed us on many interesting subjects. Among the most notable, I find that of "Atmospheric Dust and Disease Germs, including the present state of inquiry into the cause of Diphtheria," also "Micrococci," "Unicellular Organisms" and "Minute Animal Organisms." At another time he exhibited "living specimens of pond life, animal and vegetable," with a running discourse as to their habits and method of reproduction. His evening with the lantern, when he gave us an exhibition of a large number of diatoms from negatives prepared by himself, was one we look back to with pleasure and satisfaction. The results of his close application to the science of "photomicrography"—for it has become more than an art—makes it possible to understand still more of nature's unseen wonders.

It gives us great pleasure to note the presence at many of our meetings of our old-time co-worker and fellow-member, Dr. Harkness. The *homo Nevadaensis* and Academy of Sciences had so occupied his time for a season, that he found it impossible to give the microscopic matters that naturally came before us the attention that they deserved; he was willing, and we were desirous he should devote to them and us. He has not only been with us several evenings, but twice he has given us lectures on the topics previously announced. That on "Galls and Gall Flies" abounded in much information, and his collection of the various specimens he exhibited in the course of the lecture was very interesting in connection with the address. At a later day he addressed us on the subject of a "New Protococcus and other Minute Algae," which led him into the realms of the germ theory of malarial diseases.

Receptions.

We have not held our usual annual reception, the last time we came before the public being at the Harmon Seminary in October, 1882. We should not allow another year to pass without this annual gathering of our friends being permitted. They look forward to the occasion with interest, and we have only to be troubled as to whom we can omit from our list of invitations. The information so pleasantly gained is never forgotten, and such semi-public gatherings coupled with the excellent reports and epitome of our meetings furnished the newspapers by our efficient Secretary, Mr. Wickson, does more in the general diffusion of such scientific knowledge as properly comes under the microscope than all the exhaustive monographs and treatises which are printed and carefully placed in book stores and libraries.

The Future.

After the business of this annual meeting is concluded, let us each determine to do more in the coming months than ever before. We are banded together not for fraternal or charitable purposes, but to aid each other by an interchange of information. It is intercourse of ideas, friction of thought, which will brighten each other's perceptions, and let every one in this little scientific body do his best in the position assigned him by nature or inclination. Let those of us who love the rocks and the plants and animal life make a close study of all the phenomena evinced by nature in their life and death, their growth and reproduction, and give us the fruits of the investigation. We have a broad field, a rich field, and the workers are few. More hours taken from business cares and devoted to the study of the things about us will surely lengthen our days, enrich our minds, and cause our memory to live a year and a day longer.

Very respectfully,

C. MASON KINNE, President.

Election of Officers.

The election of officers for the ensuing year resulted as follows: President, C. Mason Kinne; Vice-President, S. M. Mouser; Recording Secretary, E. J. Wickson; Corresponding Secretary, C. W. Banks; Treasurer, A. M. Hickox.

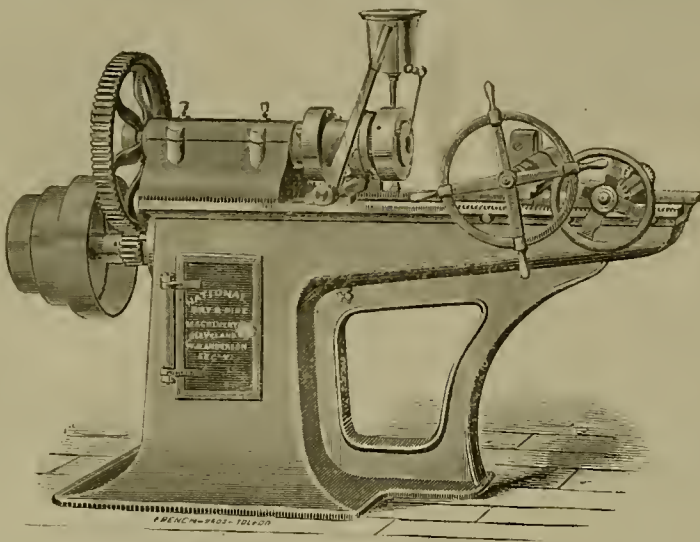
SOME of the snowbanks on the Central Pacific have been blown up with powder.

Screw and Bolt Cutters.

Mechanical closeness and perfection in workmanship in screw-cutting tools have been demonstrated by Sir Joseph Whitworth, in England, who has, perhaps, advanced this art more than any living person. Take his surface plates, clean and dry, place them one upon the other, and the upper one will appear to float on a thin

on top and bottom, leaving three-quarters. Whitworth's is a sixth, leaving two-thirds of pitch line. The necessity for a general uniform standard is so generally conceded, the National Machinery Co., in constructing their bolt cutter dies, have given this subject considerable attention. The position to place the cutter in has been carefully studied out, and their machines are constructed with great care.

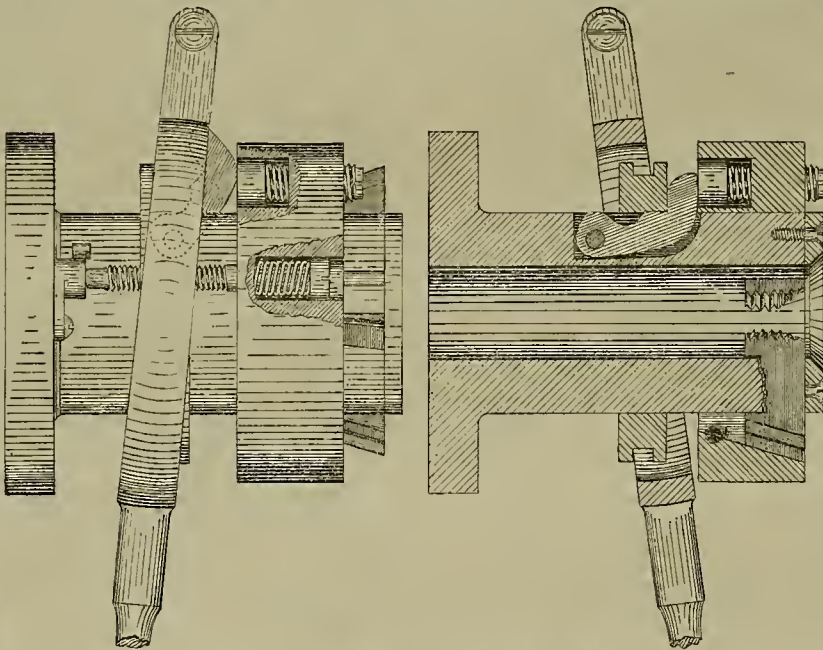
The main feature of a bolt cutter undoubtedly



NATIONAL BOLT CUTTER.

stratum of air. Expel this and you can raise the lower plate by lifting on the upper one. His standard ganges, when left together a short time, lose this air cushion, and have to be driven out. This same scientific mechanic has given great attention to screw threads, and we owe

is the head or die chuck. The National head or lathe vice has to recommend it strength, rapidity in charging dies, solidity of dies, ease in stripping or taking apart, adaptability to different kinds of machines, and adaptability in connection with the lathe vice to lathes, giving



NATIONAL HEAD AND LATHE VISE.

the scientific system of the present day principally to him. He demonstrated that the angle of 55 degrees was the strongest, and the round top and bottom the best form of thread, and it has consequently been adopted by the English government and people, and by many others elsewhere.

In consequence of the difficulty of any ordinary machinist finding this angle, and the

small machinists a cheap and handy bolt cutter. One of the engravings on this page shows a section of the National head. It is the only moveable, adjustable case die head in the market, this feature being patented. The cutters in the case die are plain pieces of steel, cut off on the anvil and placed in the case ready for hobbing, and capable of being well worn out, as there is an adjustable screw on the back of the case.

One of the engravings represents also the No. 3 National bolt cutter, specially adapted for machine shops, railroad shops, etc. It will cut from $\frac{3}{8}$ to $1\frac{1}{2}$ inches. Different sizes of these cutters are made which will cut from three-sixteenths to four inches. This No. 3 weighs, with countershaft, 1,300 pounds. Messrs. Parke & Lacy, of this city, are agents for this coast for these tools.

A NEW PROTOCOCCUS.—At a recent meeting of the Microscopical Society, Dr. H. W. Harkness, honorary member, addressed the society concerning his recent achievements in scientific discovery and classification. He exhibited specimens of four new genera and thirty species of fungi—some parasitic on the eucalyptus tree. He also gave a full description and exhibited specimens of a new protococcus. This species was found by him in the Fresno big tree grove attached to the decaying trunk of a *sequoia gigantea*. This is much larger than any other species of its genus, is ruby red in color, and is invested with a byaline vitreous envelope. The Doctor exhibited not only the perfect plant, but also the different stages of its growth, and the display was examined with much interest.

Our Home Industries.

Meeting of the Manufacturers' Association.

A general meeting of the Manufacturers' Association of California was held at the Patent room of the Mechanics' Institute on Thursday, the 21st inst., President A. S. Hallidie in the chair. Among those present were I. Hecht, of Buckingham & Hecht; Mr. Larkin, of Larkin & Co.; P. Duodon, boiler maker; F. C. Clark; Byron Jackson, of the Agricultural Works; Mr. Schmidt, of the Schmidt Lithograph and Label Co.; J. H. Small, machinist; A. Haraszthy and H. Epstein, of Haraszthy & Co.; John Roach, instrument maker; S. P. Taylor, paper manufacturer; H. Phelps and W. S. Phelps, of Phelps Bros.; Mr. Peckham, of the San Jose Woolen Mills; Mr. Starbird, of Starbird & Goldstein; Abner Doblo, iron and steel; James Spiers, Fulton Iron Works; H. L. Davis and A. S. Hallidie, of California Wire Works; W. T. Garratt, brass foundry; Wm. Harney, of Golden Gate Woolen Mills; E. G. Denniston, San Francisco Electro-plating Works; Mr. Evans, of Thompson & Evans; Lewis H. Sharp, attorney for the Board of Directors; W. H. Holmes, carriage manufacturer; L. B. Benchley, of Pacific Rolling Mills; R. H. Savage and R. Savage, of Empire Foundry; Mr. Campbell, of California Bellows Manufacturing Co.; S. M. Smith, of Cutting Packing Co.

The first business considered was an amendment to the by-laws offered by Mr. Harney at the Directors' meeting of Jan. 11th, being an amendment to Section 13. The old section was stricken out and the following substituted: "All persons or firms engaged in the manufacturing business within the State of California are eligible to become members of this association."

The reason of the adoption of this is that it was found that many manufacturers have to import some articles necessary for their work. Under the old rule many manufacturing firms, such as Holbrook, Merrill & Co. and J. C. Johnson & Co., were shut out from the association because of they also imported either raw material or some manufactured goods. The new rule widens the field of membership materially.

The Executive Committee made a report on the subject of coast defenses previously referred to them, and presented the following memorial to Congress, which was adopted, and the Secretary directed to forward it duly signed:

MANUFACTURERS' ASSOCIATION OF THE
STATE OF CALIFORNIA.
SAN FRANCISCO, February 21, 1884.

To the Honorable Senate and House of Representatives in Congress assembled:

WHEREAS, Our navy and fortifications are inadequate for the protection of the Pacific and Atlantic coasts, and would be almost useless against the aggression of a foreign foe, with a coast line of thousands of miles bordering on both oceans, everywhere exposed to the attack of a naval force; with fortifications armed only with smooth-bore guns; with prosperous and growing cities utterly defenseless against any power possessed of a few first-class, modern war vessels, this country has for years done nothing comparatively for the national defense afloat; it would, therefore, result that in the event of a maritime war, the same would be at the mercy of the enemy.

WHEREAS, The Chamber of Commerce of San Francisco has memorialized Congress, urging the prompt increase of the United States Navy, by the addition thereto of modern ships armed with effective ordinance. Like sentiments are set forth in the report of the First Advisory Board of November 7, 1881, composed of officers of the United States Navy, of recognized ability.

WHEREAS, The said memorial of the Chamber of Commerce, together with the said report of the First Advisory Board, fully expresses the views of the Manufacturers' Association of the State of California. Therefore, be it

Resolved, That the Manufacturers' Association of the State of California, at its general meeting, held in the city of San Francisco, this 21st day of February, 1884, fully indorses the said memorial of the Chamber of Commerce and the recommendations set forth in said report of the First Advisory Board on said matters, and hereby instructs the Board of Directors of this association to forward to Congress, through the California delegation, copies of the same, with an energetic approval of the policy therein advocated, and urge our Representatives in Congress to do what they can to further the construction of vessels and improvement of fortifications for the protection of our coasts.

President A. S. Hallidie read an address, which is appended to this report.

At the conclusion of the address the President invited the gentlemen present to express their views upon the subjects most vital to the Association. In response to this Mr. Sidney M. Smith offered some very pertinent and useful suggestions, which were attentively listened to. Mr. Smith is President of the Cutting Packing Co., and he spoke of the lack of practical encouragement given to our local manufacturers, and the lack of local pride in our home products. A woolen manufacturer had told him that in order to dispose of his cloths his company had been obliged to put a foreign mark on them. Another drawback was that men of mediocre means starting in business had not the favor of the banks extended to them.

Mr. Harney did not entirely agree with Mr. Smith on the latter proposition.

Judge Peckham, of the San Jose Woolen Mills, made a few remarks. Col. R. H. Savage, the foundryman, then made some remarks on the serious question of employment and labor of subordinates, and the methods of effecting

(CONTINUED ON PAGE 160.)

Reissue Patents.

The United States Circuit Court on Powder Patents.

Judge Lorenzo Sawyer, of the United States Circuit Court, has rendered the following oral opinion in the case of the Giant Powder Company vs. the Safety Nitro Powder Company:

In the case of the Giant Powder Company vs. the Safety Nitro Powder Company, a motion for leave to file an amended plea, setting up several distinct defences, has been argued in connection with the argument as to the sufficiency of the plea already filed. The Giant Powder Company was the owner of the original patent, number 78,317. This patent was surrendered and reissued as patent 5,619. Afterwards, for the purpose of correcting a clerical error, patent number 5,619 was surrendered and reissued as patent number 5,799. A suit upon this last patent was decided by Mr. Justice Field in this court, in which it was held that the reissue was broader in its scope than the original invention, as described in the patent, the original patent, number 78,317, being for a combination of nitroglycerine with some non-explosive absorbent material, while the reissue embraced explosive as well as in explosive absorbents; and Mr. Justice Field held that in that particular the reissue was broader than the original patented invention, and for that reason void. (Giant Powder Co. vs. Cal. Vigorite P. Co., 6 Sawyer, 509.) This being so, patent 5,799 was surrendered and reissued again in patent number 10,267; and in patent number 10,267 both the specification and the claim are identical with those of the original patent number 78,317, which had before been surrendered and reissued in the patents heretofore mentioned.

These facts are set up in the plea, and it is claimed that patent No. 10,267 is void, it being identical with the original surrendered patent number 78,317. That patent was surrendered as being inoperative, and, as a reissue can only be had where the patent is inoperative, it is claimed that the original patent must have been held to be wholly inoperative. I think counsel are mistaken in the proposition.

A Patent may be Inoperative.

In my judgment, when it is inoperative in part, I do not think it must be absolutely inoperative in its entirety. If it is inoperative so far as not to cover all that the party is entitled to claim, and what he is entitled to claim appears in the specification, it being inoperative to that extent, I think it would be inoperative within the meaning of the provisions of the statute, and entitle the party to a reissue. It does not necessarily follow that patent number 78,317 was wholly inoperative, or void, or useless. I am not aware that it has ever been held to be utterly invalid in all its parts.

The question of fraud in procuring the reissue in my opinion does not arise on this plea, because the question as to whether a mistake has been innocently made in not covering by the patent all that the party was entitled to cover, the question whether there is a fraud in the surrender and application for a reissue is for the officers of the patent office alone to decide, and their determination is conclusive in a collateral proceeding. This court can only examine and pass upon what appears upon the face of the patent, and see whether there is anything to indicate its invalidity, or render it void upon its face. All questions of fact behind the patent are to be examined, heard and conclusively determined by the Commissioner of Patents. This principle has been affirmed over and over again by the Supreme Court.

I do not think the fact that the patent was reissued in the identical

Terms of the Original Patent

Number 78,317, renders it void. The specifications of the patent last surrendered were amended by omitting the objectionable parts. Patents are constantly reissued for portions of the specifications and claims in the identical language of the original patent. Each claim in its nature substantially and in effect covers a distinct and separate invention and is an independent patent in substance and effect. It might be the subject of an independent patent; and if in any reissue, so far as the patents are identical, those claims are valid in the reissued patent having another or additional valid claim, or a modified claim, or some other change in the specifications. I do not perceive why they would not be valid in a patent limited to them alone. If they can all stand together, I do not see why a reissued patent, covering the identical claims by themselves, may not stand and be valid.

Patents may be Reissued in Divisions.

It is not necessary that all claims in the reissue should be included in one patent. They are often issued in divisions, and I suppose that a patent might be reissued in divisions in the identical language as to some of the claims, the changes being included in another and separate division or patent; that is to say, all claims or inventions which are fully covered and operative, may be reissued by themselves in one division in the identical language of the original surrendered patent; and all other claims or the amendments to the specifications, and covering the invention shown by the amended specifications in another division or patent. I do not see why a part of the original claims may not be reissued in one division in

identically the same language as in the original patent and the rest in another. If this can be done without affecting the validity of the reissues, and a party finds that he has made a mistake and surrendered a valid patent and obtained a void reissue, I do not perceive why he may not fall back upon his old patent and have it reissued on a newly-amended specification embracing that portion which is valid. If parts which are identical are valid in connection with other parts in a reissue, I do not perceive why they should not be valid in a reissue containing no additional matter.

Now, in this particular class of cases it is quite extensively claimed by the bar, I think, that the Supreme and some of the Circuit courts have made something of a departure in some of their

Late Decisions Upon Reissues.

Including the reissue in question. Mr. Justice Field held patent 5,799 to be void, while several of the Circuit Judges at the East held it to be valid. Where courts make a mistake it may very properly be conceded that a party may very well make an honest mistake himself. On the argument of the plea my attention has been called for the first time to the case of Gage vs. Herring, 107 U. S., 646, in which I think the principle involved in the plea is distinctly determined. The court says: "The invalidity of the new claim in the reissue does not, indeed, impair the validity of the original claim, which is repeated and separately stated in the reissue of patent. Under the provisions of the patent act, whenever, through inadvertence, accident or mistake, and without any willful default or intent to defraud or mislead the public, a patentee in his specification has claimed more than that of which he was the original and first inventor or discoverer, his patent is valid for all that part which is truly and justly his own, provided the same is a material and substantial part of the thing patented, and definitely distinguishable from the parts claimed without right; and the patentee, upon reasonably recording in the Patent Office a disclaimer in writing of the parts which he did not invent, or to which he has no valid claim, may maintain a suit upon that part which he is entitled to hold, although in a suit brought before the disclaimer he cannot recover costs. Rev. Stat. Sec. 4,917, 4,922; O'Reilly vs. Morse, 15 Hon., 62, 120, 121; Vance vs. Campbell, above cited. A reissued patent is within the letter and the spirit of these provisions."

The Plea Overruled.

If a reissued patent is within the letter and spirit of these provisions, as stated, and "the invalidity of the new claim in the reissue does not, indeed, impair the validity of the original claim, which is repeated and separately stated in the reissued patent," it is not apparent to my comprehension why a second reissue, embracing the valid claim alone of the original patent, would not be valid. I cannot, therefore, say that the patent number 10,267 is void by reason of anything asserted in the plea, upon the grounds set forth. The plea must, therefore, be overruled.

With reference to the filing of the proposed so-called amended plea, I think it is not within the reasonable discretion of the court to allow it to be filed at this late day. In view of the circumstances of this case, as they appeared before this court in the various stages of the proceedings, I think it would be an abuse of its discretion to allow the plea to be filed if it were otherwise a proper plea. In fact, the proposed amended plea sets up all the defences that can be made to a patent, and it would involve the trial of the whole case with the exception of the single question of infringement.

The object of a plea, where there is some certain single issue, requiring but little evidence, that will dispose of the whole case if sustained, is to try that issue without putting the parties to the expense of the trial of the case at large, and pleas are limited to a single defence or issue, unless by permission of the court the defendants are allowed to plead double. If the court allows this so-called amended plea to be filed, it would allow parties to try all the issues in the case with the exception of the one issue as to infringement, and it would be necessary to try the whole case on the merits by piecemeal. Besides, it comes too late.

Leave to File Denied.

After this plea was originally filed it was stipulation that it stand for an answer, so far as it was available as a defence. An answer and replications were filed, and the parties commenced taking testimony. In the course of taking the testimony the attorney for the defendant ascertained the importance of having the case decided on his plea, provided it was good, and thought he was at a disadvantage in his then position. He therefore moved upon affidavits to be relieved from the stipulation, taking the plea for an answer. He claimed, among other things, to have misunderstood the practice of the court. After argument, the court, thinking there might be something in the plea, as this exact point had never been decided, so far as it was aware, and, if good, it would save the expense of a trial, relieved the party from the stipulation and allowed the plea to be set down for argument. I did not think the exact question had ever been presented before, and when the argument was made upon the stipulation I had not seen the case of Gage vs. Herring supra which I think decides the principle. I thought there was, perhaps, something in the plea. At all events I thought it was worthy of being carefully considered, for

if the plea is good and the patent absolutely void upon its face, I saw no occasion for putting the parties to a great expense of going to a trial of all the issues in the case. I, therefore, set aside the stipulation, and allowed the defendant to withdraw its answer in the case and set the plea down for a hearing. It was set down for a hearing, and continued from time to time, until finally it came up for argument, counsel from Philadelphia coming out to argue the case on the validity of the plea. When the plea was called for argument, it was found that there had been a change of attorneys, and an application was made by the substituted attorney at the moment for leave to file the proposed so-called amended plea, which presents all the issues in the case, with the exception of the one issue of infringement. I think, under the circumstances, it would be improper, and would be an abuse of discretion to allow this so-called amended plea to be filed at this late day.

Leave to file the proposed amended plea is therefore denied.

Building Stone on the Pacific Coast.

Stone suitable for building and similar uses is abundant in all the Pacific States and Territories. Besides mountains of granite and immense beds of sandstone, there occurs in many parts of the country a species of steatite well adapted for building purposes, being light, fireproof, very durable, and easily quarried and dressed. Much use is made of this stone in the localities in which it abounds, more especially in sections of the distant interior where lumber is scarce. Neither stone nor brick is much employed for building in these Western regions, lumber being almost everywhere cheap, and climate and convenience favoring its extensive use. Even in the large cities more than three-fourths of the structures of every kind consist of wood; many of them, however, have brick or stone foundations.

Granite.

Large quantities of granite are used in San Francisco, and some of the other large towns, for curbing the sidewalks and street crossings. This stone is extensively quarried at Folsom and Natoma, in Placer county, California, and at Rocklin and Penryn, situated on the Central Pacific railroad, 22 and 28 miles, respectively, from the city of Sacramento. The granite at these places is of excellent quality, that obtained at Rocklin and Penryn being considered especially good. As the deposits here are very extensive and the rock splits evenly, it is possible to break out blocks of large dimensions, some more than 100 feet long, 50 feet wide, and 10 thick having been quarried out and afterwards broken up into smaller pieces.

The Penryn granite works are some 28 miles east from Sacramento, on the line of the Central Pacific railroad. The first of the several quarries from which the stone is procured was opened in 1864 by the present owner, Mr. G. Griffith, whose establishment is the most complete on the coast. His quarries cover some 650 acres at Penryn and Rocklin, the latter point being six or eight miles distant from the former in a due westerly direction. The cutting and polishing works, located near Penryn, and the principal quarries, are extensive. They consist of various buildings and sheds, filled with machinery employed in cutting and polishing the granite. Here 200 men find constant employment, and the force is frequently much greater. The chief superiority and predominating excellence of Penryn granite consist in the fact that it does not change color by exposure, and that it contains no iron. These advantages give to the Penryn granite superiority when used for monuments, tombstones, or when placed in any position where it will be exposed to the elements. The predominating shades of Penryn granite are blue, gray and black, the last named very much resembling the celebrated black granite found in Egypt, and exceedingly beautiful when highly polished.

Granite quarries are worked at a great many other places in California and elsewhere on the coast.

Marble.

Carbonate of lime in nearly all its forms is abundant on the Pacific coast and in the adjacent Territories, especially as limestone. Marbles in great quantity and in every variety are found in California, the following localities being noted for their fine beds.

Near the town of Columbia, Tuolumne county, where the deposit is of great thickness: masses weighing as much as 600 tons have been blasted out, and single blocks weighing 13,000 pounds have been quarried and dressed. For sawing the stone into slabs and other required forms a water-power mill has been put up at the quarry, from which a good deal of marble has since been taken out and sold, the most of it having been used for building purposes in San Francisco. In color this marble is much diversified, some portions being an unclouded white, while others are tinted with a blue or gray, or a blending of hues of many kinds. It is all fine-grained and extremely hard.

Four miles from the town of Snism, Solano county, where the stone in its rough state has exactly the appearance of rosin, it occurs in heavy beds, blocks measuring 800 or 900 cubic feet having been broken out here. A great deal of marble has been taken from this quarry, the unique tints of the material and its fine grain recommending it for many ornamental uses.

On the McCloud river, near Copper City,

Shasta county, a pure white marble is found, fit for all kinds of delicate work, even for statuary. Being in a remote and sparsely settled region, not much has been done with this bed, though it is said to be very extensive.

At Indian Diggings, El Dorado county; above Downieville, in Sierra county; at Susanville, in Lassen county; and in Placer county near the line of the Central Pacific railroad, occur heavy beds of marble of almost every degree of color and fineness, though none of them have been extensively worked. The deposit at Indian Diggings, opened in 1857, the first ever worked in the State, is of the clouded variety, and has been much employed for monuments and like purposes. In this bed, which is over 100 feet thick, there occurs a grotto nearly 700 feet long and from 20 to 80 feet high.

While there has always been a great demand for marble in California, only the more common kinds obtained from the quarries opened in the State have been largely used, the finer varieties having been imported from Italy. Much of the stone in California is of excellent quality, being a pure white or beautifully variegated, susceptible of the highest polish. It is probable that none equal to the Carrara has yet been met with in the State, but from the quality of some already found near the surface, it is thought that marble equal to the best foreign will be obtained when the deposits come to be worked to greater depths. In addition to the kinds already mentioned, there are handsome specimens of the Cipolin, white with shadings and streaks of green, and the Porton or Genesee yellow; also, what is termed Ruin marble, a yellowish stone with broken brownish lines resembling the ruins of fortifications, castles and other artificial structures.

What has tended to prevent the larger use of the domestic product has been the cost of transportation, which from almost any of the quarries to San Francisco has been greater than from Italy to that point. Through the construction of railroads into the interior the transportation of marble is likely to soon be so cheapened that the principal supply will thereafter be obtained from home sources.

It does not appear that much, if any, marble has as yet been found in the State of Nevada, nor is this stone so abundant in any other part of the Pacific coast as in California. Enough of the carbonate of lime occurs everywhere, however, in other forms to make all the lime required for local purposes, Oregon alone forming an exception.

Sandstone.

A handsome fine-grained sandstone of a greenish gray color is quarried on Angel island in the bay of San Francisco. A brown sandstone obtained near Haywood's, Alameda county, California, is much used in the cemeteries as bases for monuments, constructing vaults, etc. A bed of sandstone of a pinkish color, streaked with wavy lines of brown and purple, occurs near the Merced river, in Mariposa county, which, being very beautiful and durable, would be likely to come into large use were the locality more accessible.

Slate.

While slate is very common stone on the Pacific coast, the fissile variety suitable for roofing has been found only in a few localities; one of these being near Copperopolis, Calaveras county, California, where a stone of a very good quality is found in abundance. A bed of similar slate was opened over 20 years ago in Amador county, California, and worked for a short time, when the enterprise was abandoned, there being little demand for it when gotten out, asphaltum, tin and shingles continuing as before to be preferred for roofing purposes.

"Trachyte."

In various parts of the western mining region an igneous rock, generally known as "trachyte," is found. It is usually of a pinkish-gray color, and affords convenient and most desirable stone for building purposes, being soft when first taken from the quarry, but gradually indurating on exposure to the atmosphere. This hardening property, however, is sometimes claimed on slight grounds. The stone is durable and resists a high degree of heat.

A FLOATING FIELD OF PUMICE STONE.—The steamship *Bohndell Castle*, which arrived today from London, reports having passed through an immense field of pumice stone extending from latitude 8° south and longitude 80° east to latitude 16° and longitude 100° east. The pumice stone varied in color from grey to dark red, and there was for a long time no getting away from it. Its appearance is supposed to be attributable to the recent volcanic disturbances in the Indian Archipelago.—*South Australian Observer*, 29th Dec., 1883.

USE OF LOW STEEL.—Builders of machinery and machine tools are rapidly substituting low steel for refined iron in the parts of machines subjected to strain, and yet requiring stiffness. Low steel is extensively used in drop forging, and for many objects is preferred to Norway or Swedish iron. It will bear as soft heating, leaves cleaner lines, and is superior in stiffness, although it is exceedingly tough and fibrous.

ONE PATENT WORTH \$25,000,000.—The value of the telephone patent is enormous, and we very much doubt if it could now be purchased for \$25,000,000. It is probably by far the most valuable single patent which has ever been issued.—*Electrician*.

A Notable Literary Workshop.

Dictionary Making Letters of Prominent Men Valuable Autographs.

The work of compiling the editions of Webster's Unabridged Dictionary goes on quietly from year to year, as it has gone on for years before. The last edition of this work was brought out in 1879, and, as in the past, editions have been brought out only once in twenty years; it will be a number of years yet before another edition of this voluminous work will be given to the public. And thus our city rules the world in one respect, for from her as a center emanates in every direction the decrees which govern good English the world over. We who live in the city never stop to think what a notable interest we foster till some stranger comes to town, who, instead of asking us to direct him to the United States armory, or some other well-known point of interest, asks first: "Where do they make dictionaries?" One of the members of the firm which has the work in hand went through the letter book of prominent men, and showed a reporter at some length the

Autograph Letters

Of many notable persons, some of whom have already passed into history. Probably no business firm in the country possesses an equally valuable and choice collection; and, to a person interested in such matters and in studying the characters of some of the men who penned them, they form a most interesting subject and study. Letters from Governors, College Presidents and that ilk are common enough. A letter and envelope, each bordered with the deepest of mourning, from the President's office, signifies the time when it was sent, and the deep mourning into which the nation was thrown two years ago at this time. A letter from the young King of Siam, Chulalongkorn, dated at the Grand Palace, Bangkok, and written by his Private Secretary, states that he shall always keep the invaluable book upon his desk. The Secretary has a sweet little name, by the way. It is Dwanudaywongse, and he omitted to state what the King called him for short. The letter was quite finely worded and penned. The elephantine proportions of David Davis would not for a moment be suspected from his letter; while Ralph Waldo Emerson wrote a charming little letter, so neat and modest, on note paper of delicate size, the whole so characteristic of the man. Letters from Longfellow and Whittier, Holmes, Howells, James T. Fields, Bancroft, the historian, Rutherford B. Hayes, Evans and Viceroy Said, of Egypt, are only a few of the more notable ones. The firm is also in receipt of a large number of

Curious and Amusing.

And in some cases cranky letters, from individuals all over the world. A Burlington (N. J.) Quaker has a very characteristic way of writing his postal cards. Before and after the date he places Scripture references, and follows with a short sermon, and the hope that "we may be kept from rum, tobacco, opium, tea, coffee, drugs, salt, pepper, lard and all condiments, and swine's meat, theaters, etc." He then proceeds to drive as sharp a bargain as his conscience will allow. A western editor wrote that "he might just as well try to keep house without a wife, as to run a paper without a Webster's Dictionary." Another South African trader wanted to trade monkey skins and oil for Webster's Unabridged, and thought he could do quite a business. The advertisement during the winter of Webster's Unabridged as a holiday gift seems to have sadly misled some unsophisticated mortals, with a faith that is really childlike, and one of them writes: "Will you please send me your holiday gift, Webster's Unabridged Dictionary, for my birthday?" Another one wrote that he "had seen their advertisement of a holiday gift of Webster's Unabridged, and if they sent it to any one he hoped they would remember him." In a little cabinet is the original manuscript—the copy sheets returned from the hands of the printers with the handwriting of the various scholars who have contributed to the perfection of the work—Dr. Mahn, of Berlin, the author of its etymologies, of specialists who have suggested the definitions of technical words, and of the editors who have revised and boiled down both. The dictionary was first published by Dr. Noah Webster, in 1828.—*Springfield (Mass.) Union.*

A BONANZA OF SNOW.—Mount Davidson is now a grand bonanza of snow. This snow the winds, waltzing about the top of the mountains, pick up and shower down on the just and unjust alike. At times this snow is hurled down into the town by shovels. Though the snow down in the city is moist, that on the mountain is still dry and frozen. With a gale blowing, though the sky be cloudless, the snow often comes down over the town faster than when the heavens are overcast and every cloud is snowing its best.—*Virginia Enterprise.*

COEUR D'ALENE GOLD.—All the gold found at Coeur d'Alene is coarse and unworn, with few particles of quartz attached, and seemingly but little water-washed. Most of it has been found in crevices and between the layers of the rim of the bedrock, known as rim-rock. The bedrock is of the hardest kind, commonly known as a kind of slate. It is very rough, full of seams, in layers of an angle of about 45 degrees. At the middle of the creeks it is from one to five feet to bed-rock.—*Idaho World.*

USEFUL INFORMATION.

Tempering Glass.

A recent work, *Le Verre et le Cristal*, by M. J. Henrivaux, Assistant Director to the glass factories of Saint Gobain, Paris, is full of facts as interesting to the general reader as to the specialists. This is what it tells us of tempering glass:

The operation of tempering consists in immersing the glass when heated to redness, in a bath of a given temperature. At Choisy-le-Roi this branch of the industry is carried on to a very large extent, and the experience obtained there indicates the following details of practice: Water is entirely unsuitable for this purpose, and only perfectly pure grease or oils give a good result. A mixture of three fourths of linseed oil and one-fourth grease is very satisfactory, but it must contain no impurities, and improves in quality with age and use. The temperature required ranges between 150 degrees and 300 degrees Cent.; glycerine is also well adapted for the purpose. The oil is kept at the required temperature in cylindrical iron vessels, which can be moved conveniently, and the objects are placed in light iron wire baskets immersed in the oil. After being brought to the required heat and plunged in the bath, the latter and its contents are removed on suitable trucks to a cooling room, where after four or five hours the temperature falls to about 40 degrees. The glass objects are then removed, and kept in a stove at a temperature of 70 degrees Cent. for about two hours, by which time all the oil clinging to them has run off. They are then immersed successively in a bath of water saturated with caustic soda, and heated to 60 degrees, in a bath of water at 50 degrees, and lastly in another water bath of air temperature. The actual cost of tempering appears to be .025 franc for drizzling glasses; .030 franc for glass chimneys; .050 franc for lamp globes. Careful experiments have been made on the increased resistance to strain of glass that has been tempered. Briefly, these experiments show that the elasticity of tempered is double that of ordinary glass; that its resistance to fracture under a load is 2.5 times greater, and for doubly tempered glass 3.10 times. Polished tempered glass is 3.57 times, and rough glass 5.33 times stronger than the corresponding glass untempered. M. Henrivaux points out that the changes produced by tempering are purely physical. The operation changes the molecular structure of the glass, it becomes less dense, and the broken fragments have no sharp angles.

PRESERVING HARNESS.—The first point to be observed is to keep the leather soft and pliable. This can be done only by keeping it well charged with oil and grease. Water is a destroyer of each of these, but mud and saline moisture from the animal are even more destructive. Mud in drying absorbs the grease and opens the pores of the leather, making it ready prey to water, while the salty character of the perspiration from the animals injures the leather, stitching the mounting. It therefore follows that to preserve a harness the straps should be washed and oiled at intervals as required. To do this effectually, the straps should be unbuckled and detached, then wash with warm soft water and brown soap, and hang by a slow fire, or in the sun, until nearly dry, then coated with a mixture of meat's-foot-oil and tallow and allowed to remain in a warm room for several hours, and when perfectly dry rub thoroughly with a woolen rag. The rubbing is important, as it, in addition to removing the surplus oil and grease, tends to close pores and give a finish to the leather. In hanging harness care should be taken to allow all the straps to hang their full length. Light is essential to the care of leather, and when the harness closet is dark the door should be left open at least half the time during the day. All closets should be well lighted. To clean plated mountings, use a chamois with a little tripoli or rotten stone; but they should be scoured as little as possible.—*Harness Journal.*

A NEW FIRE EXTINGUISHER.—At a recent test of the hand-grenade fire extinguisher, a wooden box about seven feet high was set up in an open lot, and after being thoroughly saturated with tar and kerosene oil was set on fire. When the box was all aflame and the boards burned about half through, the exhibitor threw two of the grenades into the box. The flames instantly ceased and every vestige of fire, even to the smallest coal disappeared when two more were broken, the whole experiment using four grenades, costing at the price charged for them about \$2. The grenades are glass bottles holding about a pint, or half-pint, of liquid, and when broken they give off a gas in which it is chemically impossible for combustion to take place. They are designed, more particularly, for use in dwellings, factories, and on ship-board, where any small fires may be instantly extinguished without calling on the fire department. The fluid is perfectly harmless to the clothing, the hands, or in fact anything with which it comes in contact.

CANNONS OF SILK AND STEEL.—The "leather" guns of old—barrels of leather, bound with iron hoops—are to find an imitation in cannons of silk and steel. A German inventor proposes to

wrap a steel tube with silk until a diameter is attained corresponding with the ballistic power which is required for the cannon. For any given diameter, silk possesses a tenacity as great as that of the best tempered steel, and has the advantage of a superior elasticity. After the tube has been made, it is centered upon a lathe which turns with a great angular velocity. Above and parallel with the tube are arranged a number of spools of silk, which cover the surface in the form of a helix, by means of guides, without leaving any space between the threads. When the desired thickness has been obtained, the silk is coated with gutta-percha or hardened caoutchouc, in order to preserve it from air and dampness. The silk being a bad conductor of heat, the gun can be fired very often without getting hot, and it is stated that it can be more easily managed, since its weight is only one-third as great as if it were all of steel.

VEGETABLE SILK.—A German technical journal gives some details as to a vegetable substance, somewhat resembling silk, to which attention has lately been drawn by its having been exhibited in Greece. It is stated that this substance is a silky-haired portion of a tree-like shrub, which came originally from America, but is found in Syria and the south of Europe (*Asclepias Syriac*), of the family of Asclepiades. It is also known as the Syrian silk plant. The substance in question is used for stuffing very soft cushions. When mixed with silk and wool the Syrian silk is said to be used in different tissues. The milky juice of the plant is poisonous, and the tough stalks can be used in the same manner as the corresponding portions of the hemp plant. An English exchange, which has seen a specimen of this fiber, says: "It is certainly very beautiful, soft to the touch, and very silky in appearance. Whether it is likely to be used largely for manufactures is quite another matter, upon which no off-hand opinion would be worth much."

TO MEASURE FOR BELTING.—To find the length and course of a belt, apply a tape-line or string to the pulleys where the belt goes, and then measure the length of the string by a two-foot rule, which a mechanic should always have at hand; and when such measure cannot be made, make a drawing, full size or to scale, and step dividers around the course of the belt. By means of such drawings, the places where the belt passes floors and the like can also be found. These methods are more trustworthy and more convenient than any system of calculations, however tabulated, formulated, or prepared.—*Copper on Belting.*

ARTIFICIAL MARBLE.—A process of producing artificial marble and rendering it fire proof and water-proof has been patented by Mr. Richard Guelton, of Brighton, Eng. The fabrication is made by means of cements, gypsum, or alum, applied to polished surfaces or placed in moulds, fibres being applied to the surfaces to form the veins. An enamel is obtained by laying on one or more coats of varnish, exposing the article to heat after each coat, and by polishing the varnished surface with pumice stone and finally with tripoli.

GOOD HEALTH.

Photography in Hospitals.

Most of the French hospitals have now a photographic studio attached for photographing the sick persons at different times. The rapid dry-plate process is employed, and Professor Charcot, of the Salpêtrière, has devised an electrically operated camera which is very useful in taking a series of views in rapid succession. Certain classes of patients are photographed on their entry into the hospital and at regular intervals after. In cases of hysteria, for example, it is interesting to note the original contractions and compare them with succeeding ones. The photographs are placed in an album for study of the disease, and for comparison with others taken from other patients. In this way the leading features of the disease will be recognized. The new printing processes also enable these photographs to be copied and distributed to other hospitals and medical men.

Micro-photography, or the photographing of microscopic objects, is also a valuable branch of hospital work, which is becoming better recognized every day. The apparatus of Professor Charcot consists of a camera with a movable aluminum shutter controlled by an electromagnet and clock-work. A key and battery sends an electric current through the magnet at the will of the operator and, working the shutter, exposes an objective to the object. The photographer controls the apparatus by hand, and with his finger on the key, watches the patient until the desired moment arrives, then he presses his finger and exposes the plate for the instant required to take the likeness. When a regular series of views in rapid succession are required, the hand key is replaced by an insulating barrel set round with metal contact pieces, like a commutator, and these pieces make contact with a contact spring as the barrel revolves by clock-work. These metallic pieces are made of a triangular form, so that when a short exposure is required the spring is

placed so as to rub over them towards their apices, and when a longer exposure is required it is caused to rub over them near the bases. The metronome, or automatic mercury current interrupter of M. Gaide, is also applicable to this camera as an automatic key. *London Engineering.*

COPPER IN THE SYSTEM.—MM. Houles and Pietra-Santa, who have studied the matter in the copper-working districts of France, recently made a communication to the French Academy of Sciences, on the action of metallic copper on the human system when breathed in the form of dust in the foundries. They state that in a workshop where yellow copper in great quantities is turned and the air is thick with copper dust, the workmen experience no ill effects from breathing the latter, though the same dust mixed with food sometimes gives rise to slight gastro-intestinal trouble and general malaise. At Tarn (Durfort), a colony of copper-workers, living twelve hours a day in an atmosphere impregnated with copper oxide and iron oxide, or red copper dust, do not suffer from it. There appears to be no special malady due to copper inhalation; and on the other hand, any immunity from typhoid fever or cholera has not been observed, though the people are in some instances yellow in the skin and eyes with copper taken into the system.

MEDICAL VALUE OF LEMONS.—Most people know the benefit of lemonade before breakfast, but few know that it is more than doubled by taking another at night also. The way to get the better of the bilious system without blue pills or quinine is to take the juice of one, two or three lemons, as appetite carves, in as much ice water as makes it pleasant to drink without sugar, before going to bed. In the morning, on rising, at least half an hour before breakfast, take the juice of one lemon in a goblet of water. This will clear the system of humor and bile with efficiency, without any of the weakening effect of calomel or congress water. People should not irritate the stomach by eating lemons clear, the powerful acid of the juice, which is always most corrosive, invariably produces inflammation after awhile; but properly diluted so that it does not burn or draw the throat, it does its medical work without harm, and when the stomach is clear of food, has abundant opportunity to work over the system thoroughly.—*Medical Journal.*

CREMATION IN AMERICA.—The President of the United States Cremation Society says that there are 5,000 persons in this country pledged to have their bodies burned. There is as yet only one crematory, that at Washington, Pa., but plans are drawn for another, and the Society is raising the money to build it. Fifteen thousand dollars have been subscribed. The building will, besides the furnace, contain a room for the resuscitation of persons who would otherwise be burned or buried alive; another for the keeping of bodies by refrigeration until the arrival of distant mourners, who might wish to take part in funeral ceremonies, and a third in which any desired rite may be held.—*N. Y. Sun.*

HOW TO TREAT A SPRAIN.—The treatment should be applied immediately after the accident occurs, or as soon thereafter as possible—the sooner the better. The neglect of this precaution has frequently resulted in the loss of the use of a limb for months or years. If taken in hand promptly, nothing is easier than the cure of a simple sprain. Hot water is a panacea for sprains and bruises. The limb is to be placed in the water as hot as can be borne for a quarter of an hour, when the pain will have gradually disappeared.

CORSETS FOR GIRLS.—At the recent Sanitary Exhibition in England there was exhibited an unusually large number of corsets for young girls. The London *Sanitary Record*, in commenting on this, remarks that "no straight, healthy, well formed girl should ever wear one of these articles. If older persons see fit to do so in later life they may, but to put them on to the growing girls can be called by no other name than a crime." This is forcible and true, and yet how many mothers will heed it?

REMOVAL OF FRECKLES.—The careful application of a small piece of the ointment of the oleate of copper at night upon retiring will usually remove the freckles. The oleate of copper ointment should be prepared by dissolving one drachm of the salt of oleate of copper in sufficient oleo palmitic acid to make a soft ointment.—*Shoemaker.*

SHORT DRESSES FOR CHILDREN.—One of the New York school teachers writes that the very short dresses which little girls wear causes more sickness than all the badly plumbed school-houses in the city. The society with a long name should attend to its business.

THE PHYSICAL CAUSE OF YAWNING.—Yawning is supposed to arise from a reflex action of the nerves, caused by weariness, and is kindred to many other kinds of involuntary motions, that are probably derived from the nerve centers.

SODA FOR BURNS.—The chemical reason why bicarbonate of soda relieves a burn is probably due to the neutralizing action of the alkali on the acid products of decomposition arising from the burn.

Our Home Industries.

(CONTINUED FROM PAGE 157.)

proper and kind relations between employer and employee. His impromptu remarks were practical and philanthropic, extending over fifteen minutes, and were full of valuable suggestions respecting the discipline and duty to be observed by all interested.

Mr. L. B. Benchley, President of the Pacific Rolling Mills, addressed the Association, discussing the several questions which had been mentioned with business like and intelligent ability and experience.

Mr. Arpad Haraszthy then broached the labor question from the view of the farmer and wine-grower. He also made some statements upon the use of California wines under foreign names, and briefly sketched the progress and production of wine in this State, giving the amount produced and exported. His remarks exhibited comprehensive knowledge of this important subject. Mr. Schmidt, the lithographer also made some pertinent remarks.

Col. Richard Savage volunteered some experiences respecting patronage of home manufactures and products.

Mr. Spiers followed with some very proper remarks respecting schooling of boys to trades and the duty of manufacturers and employers in vouching them and seeking to correct the present restriction of trades union, in the restrictive system of trades unions, in regard to apprenticeships, by encouraging technical schools and the manufacture of specialties.

Mr. John Roach, the optical instrument maker, related some humorous incidents of his experiences with the custom house.

Mr. Hallidie then reviewed the condition of manufactures in this State, and the promise afforded by the extending population of the adjacent States and Territories, closing with a deserved tribute the results accomplished for the association by Mr. J. H. Gilmore, the late Secretary.

PRESIDENT HALLIDIE'S ADDRESS.

To the Members of the Manufacturers' Association of California—GENTLEMEN: If California intends to keep abreast of other States of the Union in the race for success she must keep her people industrious. Industry is essential to prosperity and happiness. No nation can have reasonable prosperity and contentment and be idle; idleness begets laziness, laziness sin and crime.

California began her career with great mental and physical activity that was absorbed into the pioneer life of mining and trading. Great desire for wealth spurred her citizens on to great efforts in the direction of its accumulation, and with occasional and vivid instances of success, but the majority was, as it must always be, disappointed.

Wealth is a relative term, as poverty is; the nation most blessed is the one which possesses neither; but wealth, especially great wealth, can only belong to a few, and where there are a few very wealthy citizens there also must be very many poor ones.

The happiest nation is the one whose citizens can successfully compete with human misfortunes for a life of modest comfort, and can, by reasonable toil and industry, keep the wolf from the door while respecting the rights of humanity and the will of God.

California as a Manufacturing State.

Until recently California has not been classed as a manufacturing State. Human life has been active in it, and it has done great things in a startling way, and is fond of boasting about them, but downright steady industry has been to her a comparative stranger.

Speculation has been rife and whatever of success it has met with it has always been at the expense of the many, and through it the little of the poor has gone to swell the plenty of the rich.

In city and country it was the same; the industries were few and limited; the seeker, after employment, was driven from pillar to post and post to pillar, until necessity and circumstances made him a tramp, and if he had any ambition left he took the first opportunity to leave the State; and thus it is that other States with infinitely fewer natural resources and much harsher climates have passed us in the race of life in the number and quality of its population.

No wonder! For where lands are not monopolized, and cost little where Spanish grants exist not and farms are small and industries diversified, there will you find gravitate a desirable population, whose life is industrious and habits frugal. The very

Climate of California smiles on industry. And extends a hearty greeting of invitation which industry would long ago have accepted if the people of the State had only half encouraged her. But no! They had to be whipped into it like a disobedient child. The lesson of the past 4 or 5 years certainly has been as a

chastisement for the people of this land, which it is to be hoped will not be forgotten.

California has not gained much in population during the last decade as compared with many other States and Territories, for while she has gained during that period 54% she has been surpassed in percentage of population gained during the same period by Arkansas, Colorado, Minnesota, Nebraska, Oregon, Texas, Arizona, Dakota, Idaho, Montana, Utah, Washington, and Wyoming, and has been almost equalled by Florida, Michigan and South Carolina.

The princely State of California with its inexhaustible natural resources, its genial climate and its splendid location, with its 100 million acres of land, has, during the past 10 years, gained but 305,000 inhabitants, or less than one-third of a soul per acre, or but 34 persons per day! And why is this? The answer is simply there having been no assured profitable employment for new comers, we had no new comers.

Immigration societies may strain every nerve to induce immigration; transportation companies may reduce the price of fare; journalists may write up the advantages of the country, but all to no account unless

Profitable Employment

Can be given to those who venture to come here, and unless profitable employment can be given to such it is wrong to induce them to come.

How have such cities as Chicago, St. Louis, Pittsburgh, Cleveland, Newark, Jersey and Providence built themselves up? By stock deals, speculation, apathy or idleness? No! But by using well what nature has placed at their command, and by nurturing industry and their industries, their manufactures, their little shops, their mechanics and workmen, and protecting their local manufacturers and producers by patronizing and encouraging them, and thus keeping the people busy and content to remain with them and their money at home.

Now it is just this we must do here in California, in San Francisco. We must help our industries in a tangible and efficient way, and see that our shops are kept busy; that work is provided for our mechanics; that the blacksmith, the foundryman, the shoemaker, and the farmer are made content, and that all those economic industries that go to make up the manhood, the independence, the intelligence and the happiness of a community prosper and increase.

When we remember that in 1850, San Francisco had a larger population than Chicago, and that to-day the population of Chicago is nearly double that of San Francisco, and that the manufactures of Chicago turn out nearly three times the value of products, we are struck with the anomaly of the fact, and are apt to think that there has been something wrong in our way of managing affairs. It is true.

We Should Protect those Industries

That have sprung up among us, and encourage others to found new ones. It is only by these means we can give employment to those who seek it, or can encourage families to settle and remain among us.

We must see to it that goods made in California have the preference, everything else being equal; that taxes and imports on home manufactures be lessened, and facilities for doing business be increased.

That California should receive her fair share of government work.

That easy transportation facilities be extended to home manufactures.

That legislators should be elected who are friendly to the development of home industries.

That statistics should be obtained and information imparted affecting the healthy growth of existing and the founding of future industrial enterprises, and that a sound, strong and aggressive policy should be inaugurated and maintained in the interest of our material and economic home industries.

All this can be done by a small amount of necessary but effective co-operation in the general cause, and it is for this purpose we have organized an association that will be able to protect and encourage home manufactures.

By these means we will build up and strengthen the State.

We Will Raise and Manufacture

What we consume, and export the surplus to other countries not so hasty by nature, instead of huying abroad and expending that money elsewhere, which should be devoted to keeping the wolf from the door of our own citizens.

It is by these means we will engraft habits of industry on our people, crush out lawlessness and hoodlumism, abet virtue and diminish crime.

When we consider that a merchant importer can handle millions of dollars worth of goods with the help of a few clerks, and that the ordinary labor of one man, of one mechanic, produces, say, \$4 to \$5 per day, who is of the greater value to the community, the importer who buys from abroad and sells his goods with the aid of one or two clerks, or the manufacturer who builds in his shops an equivalent amount in value and gives employment to 300 men of family, doubles the value of raw material, and places 1,500 souls above want? Through this

Association of California Manufacturers There will be a legitimate encouragement given to home industry it has never had before in this State—a practical and definite protection thrown around it, it has heretofore lacked, giving it strength and vigor and independence.

Emulation and competition as between the

manufacturers of this State will be open and free, but we will insist that as manufacturers we must be met on fair ground, and everything else being equal, have the preference.

Heretofore we have been powerless to protect the interests of the many thousands of hands engaged in manufacturing and producing, and the intention is to make this association sufficiently powerful and tied together by identity of interests of the employer and the employed, and embracing every branch of manufacturing interest that it will command respect and attention. Its main object is

To Develop the Manufacturing Interests

Of California, and to do this it must protect those interests; it will stand and prosper on the broad ground that the welfare of the industrial classes is the best interest of the State, and situated as we are, so far from the main centers of population of our common country, we must and ought to depend upon our own resources, which we propose to cultivate and develop as far as practical, independent of and in competition with the producers and manufacturers of the Eastern states and of foreign nations.

We propose to do our best to prevent excessive taxation, directly or indirectly, on industry—to prevent ignorant and dangerous legislation affecting the interest of the mechanic, the workingman and the manufacturer to demand a fair distribution of government work on this coast, to impede the importation of all articles that can be profitably and properly made here, to collect and impart information to members affecting their interests, to use our best offices to open up new avenues of trade in our own country and abroad, and by all fair and honorable means in our power to make the manufacturing and industrial interests of the State successful and profitable, and to this end we invite every manufacturer in the State to join us, and we ask the good will and co-operation of every honest and industrious man and woman in the State. That California should take the foremost

Rank Among the Manufacturing States

Of the Union seems to me to be destined. Her position gives her the command of almost the entire Pacific coast of America, and of the islands and continents to the west of her. The climate of San Francisco and of numerous other cities in the State is such that her citizens can work comfortably every day in the year, and put in full time; the various lines of railroad center towards her golden gates, while her harbor is unsurpassed in capacity and safety, and is fed by rivers running far up into the interior of the State; her factories need neither warming in winter or cooling in summer, the winter mean in the city being 51°, and the summer 60°, while the mean temperature for a number of years in the month of January gave an

average of 49°. I may be pardoned if I submit

Some Statistics

Which may be dry, but good, as good wine is dry, hearing on the manufactures of the United States—some cities in the United States, and of California and San Francisco in particular—and I would here remark that the official returns of California in 1860 were so unreliable that I have omitted them.

First, I would draw your attention to the "added or industrial values" from manufacturing, found by deducting the value of the material used in manufacturing from the value of the manufactured products, which were as follows:

Year.	For the U. S.	For Cal.
1850.....	\$468,992,704	\$1,061,368
1860.....	\$533,245,351	\$1,006,197
1870.....	1,009,855,715	3,770,000
1880.....	2,118,208,760	31,243,363
1880.....	1,972,756,422	43,611,264

The industrial values in the United States from 1850 to 1880 has increased 4½ times, and those of California 3½ times.

The amount of capital invested in manufacturing was as follows:

Year.	In the U. S.	In Cal.
1850.....	\$533,245,351	\$1,006,197
1860.....	1,009,855,715	3,770,000
1870.....	2,118,208,760	31,243,363
1880.....	2,750,272,000	61,243,784

Showing an increase from 1850 to 1880 in the United States 5.23 times; in California, 60.8 times.

The number of hands employed were as follows:

Year.	In the U. S.	In Cal.
1850.....	957,069	3,964
1860.....	1,311,244	.....
1870.....	2,053,906	25,392
1880.....	2,732,625	42,960

An increase from 1850 to 1880 in the United States of 2.86 times, in California of 10.84 times.

The wages paid were as follows:

Year.	In the U. S.	In Cal.
1850.....	\$236,755,464	\$2,717,110
1860.....	378,878,966	377,000
1870.....	775,884,243	13,136,732
1880.....	947,953,798	21,065,905

And the average amount paid to each hand (including women and children), was as follows:

Year.	In the U. S.	In Cal.
1850.....	\$247.37	\$685.45
1870.....	377.00	517.35
1880.....	346.90	495.46

This last table shows that the average wages paid in California was in 1850 2.37 times the average paid in the United States, while in 1870 it had fallen to 1.37 times, and in 1880 it had risen to 1.42 times.

The following table, which I have arranged from the census of 1880, by placing the relative ranks of each of twenty cities in the United States in the order as shown in the table, is of considerable interest, and should be inspected by those desirous of studying the relative values of the cities:

MANUFACTURING INTERESTS IN VARIOUS CITIES COMPARED, AND SHOWING RELATIVE RANK UNDER EACH HEAD.

Rank in Population.	Name of City	Rank.	Number of Establishments.	Rank.	Capital Invested.	Rank.	Hands Employed.	Rank.	Wages Paid.	Rank.	Value of Products.	Rank.	Value of Material.	Rank.	Added or Industrial Value.	Rank.
1	New York.....	11,339	1	\$118,306,356	2	227,352	1	\$37,030,021	1	\$427,926,437	1	\$288,491,691	1	\$184,454,746	1	
2	Philadelphia.....	8,567	2	157,143,357	1	185,527	2	64,265,966	2	324,944,935	2	199,155,477	2	125,187,458	2	
3	Brooklyn.....	5,201	3	61,646,749	4	47,587	3	22,437,457	3	177,225,142	3	129,085,061	4	48,137,051	3	
4	Chicago.....	3,519	6	68,833,885	3	79,414	3	34,653,462	3	249,022,948	3	179,269,610	3	69,813,268	3	
5	Boston.....	3,065	5	47,348,354	5	59,213	4	24,924,009	4	180,531,993	5	81,658,160	5	48,848,833	4	
6	St. Louis.....	2,924	9	50,882,885	6	41,825	5	17,743,532	7	114,333,375	6	75,379,897	6	38,953,508	7	
7	Baltimore.....	3,683	4	38,589,778	9	66,338	5	15,117,449	9	78,417,304	8	47,974,201	10	30,443,007	9	
8	Cincinnati.....	3,276	7	50,333,109	7	54,517	6	19,553,929	6	115,259,165	7	62,836,710	7	42,882,455	6	
9	San Francisco.....	2,971	8	35,365,139	10	28,444	11	14,928,534	10	77,824,299	9	47,978,072	9	28,816,227	10	
10	New Orleans.....	915	18	8,505,368	19	9,504	13	3,317,557	23	18,808,030	19	10,771,892	19	8,639,394	19	
11	Cleveland.....	1,055	15	19,430,089	15	21,714	13	8,502,355	13	48,904,056	13	31,629,737	13	16,074,313	12	
12	Pittsburgh.....	1,112	18	62,645,015	5	36,039	9	17,168,989	8	75,018,033	10	42,000,777	12	37,805,266	8	
13	Buffalo.....	1,183	12	26,847,937	12	18,021	15	7,442,109	15	42,937,701	14	27,582,059	15	15,385,015	14	
14	Washington, D. C.....	971	16	5,552,526	20	7,146	20	3,924,612	19	11,892,310	20	5,365,440	20	6,525,916	20	
15	Newark.....	1,319	10	25,679,885	13	30,046	10	13,711,339	11	69,252,705	11	44,934,335	11	15,043,370	13	
16	Louisville.....	1,108	14	21,767,018	14	15,448	17	5,835,545	17	35,423,237	17	21,207,110	17	12,416,093	16	
17	Jersey.....	584	20	11,809,015	18	11,338	18	4,622,655	18	6,434,935	12	49,738,985	8	10,734,920	18	
18	Detroit.....	919	17	15,594,479	17	16,110	16	6,364,406	16	33,181,416	18	18,150,095	18	12,630,421	17	
19	Milwaukee.....	844	19	15,769,014	16	20,886	14	6,046,105	14	43,473,812	14	28,967,872	14	14,497,940	15	
20	Providence.....	1,205	11	27,177,008	11	22,891	12	9,494,110	12	42,807,512	15	22,794,237	16	19,805,285	11	

San Francisco's Rank.

From the foregoing, the city of San Francisco occupies the following rank and position:

Population.	Number of Establishments.	Capital.	Hands Employed.	Wages Paid.	Value of Products.	Value of Material.	Added or Industrial Value.
9	8	10	11	10	9	9	10

The local assessor's reports, to be of any value at all, should show the actual condition of the industrial interests in San Francisco is not sufficiently reliable to be of any use. The industrial condition of the State and city it is expected will be clearly and correctly shown by the tables and statistics that will be prepared by this Association.

Mr. J. R. Dodge, the statistician of the U. S. Bureau of Agriculture has divided the States and Territories of the Union into four divisions or groups, based on the percentage of population engaged in agriculture, as follows:

First group having.....	30	and less.
Second group having over.....	30	and less than 50.
Third group having over.....	50	and less than 70.
Fourth group having over.....	70	.....

And he finds as follows for the year 1882:

If the foregoing statistics are correct, it very clearly shows the vast increase in the value of land product per head and the amount of wages paid due to the diversification of industry and introduction of manufacturing in those States included in the first and second groups.

The growth of the manufacturing interests in the United States is very remarkable—for when we look back to the year 1860, we find that the value added to raw material by the labor and skill of the mechanics and laborers employed in manufacturing was \$354,000,000, and that twenty years from that date, this added value was increased to \$1,973,000,000—we are struck with surprise, and look to some other cause than that of increase of population, for while during that period the population of

(CONTINUED ON PAGE 166.)

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—*Ledger*, Feb. 23: The Zeile is one of the few mines in the county that pay off every month with clockwork regularity. Some idea of the value of this mine in contributing to the prosperity of Jackson may be gathered when we state that nearly 120 names were on the pay-roll last month, and the sum disbursed was over \$9,000. Whilst the ore met with in this mine is low-grade—so low in fact that without the most economic management it could not be worked profitably—yet in the number of men employed it has scarcely an equal in the county. It is really a big mine in everything except the actual yield of gold per ton. During the summer months the pay-roll sometimes runs up over \$15,000 a month. The ore-bodies is of vast extent, and the amount put through the mill daily averages at least three tons to the stamp—or 120 tons every 24 hours.

MIDDLE BAR TUNNEL.—The big tunnel is now in between 600 and 700 ft. The breakage of the air-compressor shaft brought both drills to a standstill for several days this week. Everything is now in running order again, however. The face of the tunnel is in the hardest kind of rock, and progress is necessarily slow. It is believed that this hard strata will soon be passed, and that it will be succeeded by ledge matter.

MISCELLANEOUS.—Amador county can boast of the heaviest gold producing mine in California. The Plymouth Con. is far in advance of all competitors. In seven months from June last, when the consolidation of the Pacific and Empire was effected, it has paid \$350,000 in dividends alone. The Standard of Bodie comes next with 13 dividends for the entire year, aggregating \$325,000. The owners of the St. Julian had about 50 or 60 pounds of their richest ore pounded in a hand mortar on Monday last. It yielded 22 ounces of gold and fine rock and sulphurets mixed. When smelted it is expected to yield from 18 to 20 ounces of pure gold. The refuse will no doubt yield several ounces more. At the mine they are getting together a quantity of rock for the purpose of having a crushing at the Kelly mill at an early date. The Gove Company has started work on the south or old shaft. The work consists of simply repairing it to the water level. It is reported that work will commence in earnest in spring.

THE ST. JULIEN.—Amador *Dispatch*, Feb. 23: The proprietors of the St. Julien mine have purchased the small one stamp quartz mill lately used at the Tripp mine and are having it removed. It will probably be ready for operation during the latter part of the coming week. During the meantime the St. Julien still continues to produce very rich rock as usual.

THE MAHONEY.—We understand that everything has been arranged for the transfer of the Mahoney mine at Sutter creek, and that work will be resumed in the mine as soon as possible.

Butte.

THE SPRING VALLEY MINE.—Butte *Record*, Feb. 24: We notice a change has been made in the superintendency of the Spring Valley mine at Cherokee, Mr. G. P. Williams retiring, and the Secretary of the company, Louis Glass, taking the position of Supt. Mr. Glass has almost been reared in the mine, having been connected with it as boy and man for a quarter of a century, and for the past ten or twelve years has been the resident secretary of the company. While perfectly familiar with the working details of the mine, and of the means necessary to operate it successfully, Mr. Glass is well known to the people of Butte county, and to all who are likely to be damaged by the debris from the mine, and can, if any man can, while working the claim successfully, and to the satisfaction of the stockholders, deal satisfactorily with those with whose interests the working of the mine may conflict. A recent statement by Mr. Glass, showing the amount taken from the claim, and where it had been expended, appeared in the *Record*. That statement showed conclusively that the greater proportion of the millions taken from the mine had been expended in Butte county, and must have been, therefore, an important factor in the progress and prosperity of the county. We believe Mr. Glass, from his long familiarity with the mine, will be enabled to so conduct it as to render it profitable to the stockholders, without damage to those who reside in the valley below, and to continue it an inexhaustible bank which shall continue to contribute its millions to the prosperity of Butte.

Calaveras.

MINING IN TOWN.—Calaveras *Chronicle*, Feb. 23: John Peek, Amile Pellaton and Will Hutchinson prospected the ground at the foot of the lane leading to the schoolhouse, and finding good encouragement, they set sluices and commenced pitting the dirt through the boxes last Wednesday. The first half day's washing "showed up" very well.

INTEREST PURCHASED.—Mr. Joseph O'Neil recently sold his quarter-interest in the "Green Mountain" gravel claim in the Chili Gulch, to Arseen Berthel.

El Dorado.

BERRY DEVELOPED.—*Mountain Democrat*, Feb. 23: Because but occasional mention is made of our mining industries, it by no means follows that they are at a standstill. The Havillah, at Nashville, is rapidly being developed into one of the very best mines in the State, and now gives employment to about 30 men. With energetic and intelligent management, it could be made to yield a fabulous amount during the next five years. O. P. Hart owns a claim adjoining, which, from prospects, appears to be equally as reliable. At the Springfield, sinking continues, and in the course of a few months the mill will be started up on ore that will give a net profit of from \$6,000 to \$10,000 per month. The Grand Victory has been steadily in operation all winter, running from twenty to thirty stamps, and in a short time the whole fifty will be in motion. The ore is low grade, but there is an immense ledge of it, and by close economy, yields a fair profit. The Pleasant Valley, which has yielded fairly for several months past, is now being sunk upon to a greater depth. In close proximity to this city, but two miles are now in full operation with mill pro-

cess, and are both gravel mines—the Green Mountain and Elf—both having ten stamps. The Rosecrans, near Garden Valley, with its ten-stamp mill, has been in constant operation for several months, and the results are highly satisfactory. The Gopher-Boulder mine, which was closed down only a year ago for want of means to thoroughly open it, and which gives every promise of a rich mine, has been purchased by an Eastern company, and work will soon be resumed. At Slate Mountain, Dan Moncton is opening a mine that gives every promise of future success, and as he has plenty of capital back of him to fully develop it, we have every confidence in its final success. The Blair brothers are pushing their prospecting operations near Sportman's Hall, and are confident of ultimate success. If their theory proves correct, they will yet open up the richest and most extensive mine ever opened in the county. In Mountain and Consumes townships the outlook is very bright for the future, while at present the Mt. Pleasant continues to yield up its regular quota of from \$12,000 to \$15,000 per month, and the Crystal is paying handsomely, while a number of other properties are in course of development with most flattering prospects. On the North Side several mines are being worked that are remunerative, and a large number are being prospected; and as a whole, the outlook is unusually promising for that divide during the coming spring and summer, as it does, indeed, throughout the county. It will be seen from the above that our mining interests are by no means at a standstill, but with capital for development, our paying mines could be more than doubled within a twelvemonth. Besides the mines mentioned, a hundred or more claims are being worked from which therevenue is by no means inconsiderable.

Inyo.

DISAPPOINTED.—*Inyo Independent*, Feb. 20: The owners of the old dynamite mine, at Pine Mountain, had got three months' supplies, mining utensils, etc., ready to start the night before the big snow, which slammed the door in their faces, as it were, and shut them out for a week or more. This old mine has been laying around loose for the past nine years. An old shaft 70 ft deep shows good ore, and the 30 level, running south shows a large body of galena ore, which samples at the Elina furnace 56 ounces silver and 60 per cent lead. These old things will all be taken in; it's only a question of time.

FROM COTTONWOOD.—P. A. Chalfant arrived yesterday evening from Cottonwood creek, Deep Springs Mining district, where he has been engaged during the past four weeks in the preliminary work for the erection of the Greenly mill. This work has been progressed quite satisfactorily, notwithstanding the extremely unfavorable weather of the past three weeks. A force of from six to nine men have been employed upon the water ditch, which is now about complete. The two intervening ranges of mountains to be crossed in coming from Cottonwood to the river are covered nearly two ft deep with snow, just compact enough to make traveling for either man or beast laborious in the extreme. This fact may cause some delay in getting in needed supplies, therefore in the completion of the mill, though Mr. Chalfant thinks it can be got in operation early in April if not sooner.

ORE SHIPMENTS.—A. W. Eibeshutz shipped three cars of ore from the Brown Monster, last Thursday, consigned to Shelby & Co., S. F. Phil Cartier shipped ten tons from mines in Mazourka canyon to Elina, Wednesday.

SACRAMENTO MINE.—A cleanup of ore crushed from this mine, situated about nine miles east of Bishop creek, was made last Thursday, resulting in the neat find of 64 pounds of gold bullion; estimated value, between \$5,000 and \$6,000.

INDIANA MINE.—The new lessees of the Indiana mine, Swansea district, under Joseph Williams, as manager, are starting to take out ore from a very promising strata, the ore assaying on an average 400 ounces in silver and 28 per cent in lead per ton.

THE DEFIANCE.—The latest reports received here from the Defiance mine, Darwin, are to the effect that the recent strike in that property is improving in size and richness as the work of development progresses.

SWANSEA FURNACE.—The Swansea furnace, we are informed, closed down Thursday night. For what cause or for how long we are not informed.

FROM CERRO GORDO.—*Independent*, Feb. 26: Reports from Cerro Gordo just in, are that snow there in places is from 10 to 15 ft deep. Operations have been retarded on that account since the storm, but will be resumed at an early day—at least on the Ygnacio. The ore body in this mine is daily showing better and better.

Mono.

STANDARD CON.—Bodie *Free Press*, Feb. 20: During the week there were extracted and shipped to the mills 1,395 tons of ore; 838 ounces of bullion were received, and \$13,817.97 shipped to the company. Good progress is being made in timbering the north drift on the 1000 level, Upraise No. 2 is up 155 ft, showing the vein 4½ ft wide. The winze from south drift No. 2, 385-ft level, has been sunk 8 ft; total depth, 73 ft. The vein in the bottom is 4 ft wide. The stopes are looking well.

BODIE CON.—Bodie Con. showed its vitality yesterday by steadily rising from 77½ in the morning—at which figure there were some transactions—to 99½ as the closing evening quotation. This, too, in spite of the big bear, who reported so positively last Saturday that the ore had pinched out.

BULWER CON.—West crosscut No. 3 from south drift, 500-foot level, has been advanced during the week 12 ft; total length, 95 ft. The ground is hard.

Nevada.

WILL BE WORKED.—*Foot-hill Tidings*, Feb. 23: It will be gratifying to our readers to learn that Messrs. W. B. Bourn and A. W. Stoddart are meeting with success in their efforts to raise money for the purpose of starting the North Star mine. The gentlemen surely deserve success, for they are energetic and enterprising, and the opinion of every one here, and especially of those who know anything of the mine, is that it is a good mine and can be successfully worked. In the canvass the gentlemen had \$7,000 subscribed the first day. It speaks well for the future prosperity of this mine when not a single dissenting opinion is expressed as to its merits, and all seemed favorably impressed as to its value, and the probability of a speedy resumption of dividends

when the mine is got into good working shape. When the North Star was shut down it was paying considerably over expenses, and the matter of closing down the mine has always been a matter of wonder to those who were acquainted with its merits. When once the North Star starts work, it will be an incentive for other important enterprises to start up.

MCCORMICK'S MINE.—*Nevada Transcript*, Feb. 26: H. McCormick's mine on Gold Flat, in which a remarkably rich deposit of ore was struck a few days ago, has been troubled more or less of late by a rush of water, and operations have been suspended until another pump can be placed. The owner has been working there about six months, and is down 97 ft on the incline. He has had three crushings made at Martin & Michell's mill—the first paying \$18; the second, \$21; and the third, \$34. The pumping and hoisting have been done by water-power.

Placer.

THE ALTA DRIFT MINE.—*Cor. Placer Herald*, Feb. 22: Upon my return to Alta, I find that the Alta Gravel mine is still driving ahead day and night with three shifts, under the superintendency of W. E. Otis. They are now under ground about 200 ft from the shaft, in a southeasterly direction, and are making magnificent developments, as they are advancing closer towards the channel, with a continual improvement in their prospect as they go. But time and labor have demonstrated that they are possessed of a gravel deposit of great extent and of a high grade in quality. They are now operating on a line 800 ft to the northeast from the place where a rich strike was made ten years ago by the old defunct Ada Bell Co., and in a position transversely with the same channel. There are two placene river channels extending easterly from this place, main tributaries to Dutch Flat. About four or five miles of each of those lie within the rich auriferous belt, and will eventually be worked by drifting, as they are deeply buried under sand and lava, and can only be made available by the drifting process.

Plumas.

GREEN MOUNTAIN.—*Greenville Bulletin*, Feb. 23: During the past week there has been a good deal of talk about the recent developments in the Green Mountain mine, and some of the statements are a little too rosy. The long and tedious work of driving the tunnel to the Blake chimney, and the failure of the water supply that caused the mills to be stopped early in the fall, led to some embarrassment, and caused a good deal of anxiety, and when the chimney was reached at last, the relief was so great that it is possible somebody may have "slopped over" a little. Since the chimney was reached the vein has been opened fully, and is found to be 30 ft wide; a good deal of the ore prospects fairly, but how much gold it will actually yield can be determined only by milling. This ore body alone contains enough to keep the new mill busy for a long time. The almost ceaseless storm of the past month has piled up snow enough to ensure a full water supply, though two or three weeks may pass before any of it is available; but when the water shall be once let into the ditch, then no further hindrance to milling work need be feared till another winter shall come around. If this ore body in the Green Mountain mine shall come near what is hoped for in richness, then, possibly, the management might be determined to add steam power, to be used if water should fail. Aside from any interest felt here from the mine itself, this development in the Green Mountain is a matter of general congratulation. It fully establishes as fact, what has always been the general belief, that the veins in the range would improve rather than reverse, as depth is gained. This is certain to lead to great activity in mining during the coming season. Along the range are many ledges on which locations have been made, but on which the owners have never done more than the necessary assessment work; all were waiting to see how the Green Mountain would turn out. Not all of these claims, but certainly a good many of them, will now be worked vigorously, and it is hardly too much to say that the whole mountain side will be swarming with men during the coming summer, all busy burrowing into new stores of wealth.

Sierra.

LATEST REPORT FROM THE COLUMBO MINE.—*Sierra Tribune*, Feb. 23: F. S. Fisher and Philip Deidesheimer gave the following notes concerning the Columbo mine to a reporter last week: The late cold weather has slackened the water supply at the mill somewhat and necessitated the hanging up of one five-stamp battery. The other fifteen stamps have been kept running pretty regularly. The slight trouble that was experienced with the wire-cable at the start is now wholly obviated. A new wood-chute, leading to the mill, was completed last week, and works in a very satisfactory manner. Work is going steadily ahead in both the upper and lower tunnels. A new ledge was recently encountered about 460 ft from the mouth of the upper tunnel. At the point tapped the vein measures three ft in width and assays something over \$15 per ton.

THE MARGUERITE MINE.—The outlook for this property was never better than at present. The work of opening up the fourth level is progressing favorably and a fine body of ore is being developed. The Company have expended in the neighborhood of \$40,000 lately in making improvements and purchasing machinery. A portion of the machinery is now at Truckee and will be shipped to the mine as soon as the condition of the roads will permit. The hands at the mine were paid off in full this week. Supt. Myers is exerting himself to place the mine on a dividend paying basis, and he will probably succeed whenever the improvements now under headway are completed.

STOPPED.—*Mountain Messenger*, Feb. 23: The Marguerite mine has temporarily stopped work owing to inability to keep the shaft clear of water with the present machinery. Fifteen stamps have been crushing at the Colombo. The new ledge recently discovered, has a width of three ft, and the ore assays fifteen dollars a ton. A wood chute was lately completed. The Marguerite employees were paid the other day. Work is favorably progressing at the mine. The recent improvements and new machinery has cost about \$40,000.

BALD MT. EXTENSION.—Last Sunday the Bald Mt. Extension Co. cleaned up, in their small dump, over 105 ounces, 16½ pennyweights, \$1,668.57, averaging \$3.92 per carload—50 carloads. The recent freezing spell so effectually checked the water flow, that little washing could be done; but with the present warm weather the prospect is fair that

the 3,000 or more carloads of rich gravel accumulated in the large dump, will be sluiced out and cleaned up ere the close of this month, affording a handsome dividend for February. The main tunnel is being steadily pushed through the lava flow, and, as near as can be ascertained, must now be in 350 ft or more, beyond which is now a settled question will be found the extension of the pay lead.

STRUCK GRAVEL.—The owners of the Ballarat Mining Company have found gravel in their tunnel, at a distance of a little over three hundred ft from the dump. This claim is located up the ridge from the old Cold Canyon diggings, and is, doubtless on the same channel. At last accounts the gravel had not come down to the bottom of the tunnel, but the owners are confident that they are low enough. The gravel is all quartz and coarse. The owners have a large claim, covering the channel for a long distance. The claim will not be opened out and ready for work for several months, but from all indications it will prove as rich as ever were those below. The owners are A. McIntyre, M. McFarlane, John McDonald and others whose names we do not know.

Shasta.

OUTLOOK FLATTERING.—*Cor. Trinity Journal*, Feb. 23: The miners' outlook for old Shasta county is indeed flattering. The gold yield from both placer and quartz mines, will undoubtedly be very large, and both these industries are at present being pushed forward vigorously. It pleases your correspondent very much to see this storm, for it will insure both Trinity and Shasta counties a prosperous year. The present outlook is certainly encouraging. Without a doubt the long-laid Clear creek ditch will soon be in operation again. Mr. Truett is bere with that object in view. If satisfactory terms can be made whereby to start the ditch in operation again, it will be done immediately and will be of vast benefit to this county. A very rich discovery of an immense body of silver ore was, a short time ago, made by a man named Stovell, between the head of Spring creek and Flat creek. The finder has very appropriately named his rich find the "Grab," on account of an attempt being made to jump it. It is currently reported that the "Grab" is much richer than the famous Iron Mountain mine.

Siskiyou.

MINING PROSPECTS.—*Yreka Union*, Feb. 23: The miners in all parts of the county are jubilant over the fair prospects ahead, and all the leading mines throughout the county will be vigorously worked this season, and undeveloped sections will be thoroughly prospected. The railroad tunneling north has attracted many of our practical miners the past two years, and now that railroad work has been suspended, they have returned and the majority of them will engage in mining. More prospecting will be done this season than there has been in any one season in the past ten years, and it is quite probable that some foreign capital will be enlisted for that purpose. The mines on the Klamath have yielded large profits to their owners the past few years and they will be operated on a larger scale than ever before, and will undoubtedly pay an increased dividend in proportion to the additional amount of capital and labor expended. Untold wealth remains buried in the bed of McAdams creek and its tributaries, and capital invested in that section will almost double itself in a comparatively short time, while the lodes on Indian creek will prove a source of great profit to their respective owners, with excellent chances of new and richer discoveries being made. At Callahan and in the Salmon section—both rich mining districts—work will be energetically inaugurated in all the placer and quartz mines, and will produce a large revenue. Everything considered, the outlook is exceedingly bright, and will bring us into recognition as one of the leading mining districts in the State.

Trinity.

MORE GOOD STORM.—*Trinity Journal*, Feb. 23: The past week has added 3.11 inches to the water-fall of the season, much of it being snow—16 inches of the latter falling on Tuesday. During February, 3.56 inches of water has fallen at this place, making the total fall for the season to date, 22.13 inches. Cold nights have kept the water back, and up to this time miners have had but a limited supply. With warmer weather which must come soon, the flood-gates will be opened and water supplied in abundance. The opinion is freely expressed that mining in Weaver Basin will continue until July at earliest, while many predict there will be water for sluicing until August 1st. A good mining season is now certain, and plentiful spring rains will make it even better than now appears. Trinity is all right.

Tuolumne.

CHISPAS.—*Tuolumne Independent*: During the recent heavy rains the boys have found a great many chispas and fine gold on the Big Nugget ground, adjoining the Divoll Bonanza claim. These are the two richest pocket claims yet discovered in California. Capt. Colby, the owner of the Nugget mine, is getting ready to sink in the Divoll and will make extensive development. The engine and hoisting works are being repaired for that purpose.

THE MILL and works of the Toledo mine are being moved on the Willetta, on the Tuolumne, just below Jacksonville. The mill was built some two years ago by the Clement Bros., of San Francisco, and for reasons unexplained the mine has never been worked to any extent worth note. Messrs. W. G. Long and Joe Hampton, in removing the mill, found everything in excellent order—even to the mortar blocks.

SEVERAL RICH POCKET mining strikes have been made in our country during the past six weeks, but with a perversity most galling to an enterprising editor, the fortunate strikers refuse to let it be known to an interested public what was the amount received from mother earth. Secretiveness is good—very good—but who does it benefit in this case?

NEVADA.

Washoe District.

UNION CON.—*Virginia Enterprise*, Feb. 23: The east crosscut started on the 3100 level, at a point 85 ft south of the joint Sierra Nevada shaft, is out some 15 ft. As yet there is not much change in the appearance of the material passed through. The strong current of air rushing through the main drift on the 3100 level, is fast cooling off all parts of the mine. The east crosscut must soon cut some of the

ore streaks found in the station at the winze and in the joint Sierra Nevada crosscut, which was run out east a distance of 28 ft from the station.

CON, VIRGINIA.—Have about completed the work of excavating a station at the bottom of joint California winze No. 2, on the 2900 level. From this station a drift will be run to connect with the main south lateral drift. The distance to be run is about 200 ft. When this connection is made active prospecting will be resumed. The material on the 2900 level, at all points, is of a favorable character.

ALTA.—The ground in the face of the east crosscut on the 2150 level is blasting better than it did last week, and pretty fair headway is now being made. The west drift on the same level is in ground that works well, and some stringers of ore of low grade are now being cut. The pumps are working well and smoothly. They handle the water without any trouble, running at but six strokes per minute.

SIERRA NEVADA.—The northeast drift on the 3100 level is still in vein material, with some quartz. Some work remains to be done on the 2900 level in order to regulate the ventilation before crosscutting is commenced. Already the mine is being rapidly cooled by the strong current of air that passes through the main drift on the 3100 level.

GOULD AND CURRY.—The joint Best and Belcher winze down from the 2300 has reached the 2700 level. A station is being excavated at the 2700 level. At this point it is very hot, owing to the dripping in of hot water from the soft ground above.

YELLOW JACKET.—Now that the mills on the river are able to run all their stamps, a full force of men has been put to work in the mine, and a prosperous season has doubtless been entered upon. With the present ample head of water there is no danger of the wheels being stopped by frost.

SAVAGE.—Good headway is making in the north drift on the 2600 level. The ground ahead is wholly unexplored, as is much that lies above and on all sides.

BELCHER.—The mills on the Carson river are running to their full capacity, and a full force of men is employed in the mine. No more trouble at the mills is anticipated this season, unless from lack of water in case of a flood in the river.

COMBINATION SHAFT.—Sinking is progressing well. The shaft will now soon reach the 2800 level, at which point a station will be excavated, and a drift started west to connect with the Hale and Norcross on that level.

HALE AND NORCROSS.—A sump of ample depth has been completed, and a working station is being cut out at the 2800 level. The material encountered favorable character.

MEXICAN.—The repairs which have been making at the several levels from the 2500 down to the 3100 level are now about completed, and active prospecting will be resumed in a few days.

IMPERIAL.—The west drift is now in the region of the old upper levels, and explorations will be in order. The drift opens a road for the Alpha and Exchequer, as well as the Imperial.

ANDES.—The drifts are going ahead as usual, and are cutting into quartz of a favorable appearance. About the usual amount of low grade ore is being extracted.

BEST AND BELCHER.—The joint Gould and Curry winze below the 2500 has now reached the 2700 level, where a station is being cut out. The material is birdseye porphyry.

CROWN POINT.—Are again at work with a full force of miners. The mills on the Carson river, are all thawed out and running right along.

Columbus District.

MOUNT DIABLO.—*True fissure*, Feb. 23: There are no developments of note to report from the mine this week. A winze has been started from the west drift on the third level and is now down 34 ft. It shows some low grade ore in the bottom. Winze No. 5 is down 68 ft and shows a little ore of good grade. The north and south crosscuts are being driven on the intermediate between the second and third levels, but show nothing of value. The main east drift on the second level has been stopped, after being extended 106 ft, and a south crosscut has been started some 50 ft from the face. This crosscut shows spots of good ore.

COLUMBUS CON.—The work of sinking the main shaft has been discontinued. It has attained a depth of 355 ft, making a sufficient space in the mine to prospect for several months to come. The third and fourth levels are totally unexplored. After the fourth level station is completed a crosscut will be started towards the ledge. The third level connection has been made and as soon as proper arrangements have been made, such as laying a car track and cleaning out the north end of the drift, the work of extracting ore will be resumed.

RIDGE.—Richard Creer and Fred Corhill are the owners of a prospect bearing this name. It is located at the western end of Candelaria hill and a little above the head of the canyon in which has been run the upper tunnel of the Vanderbilt company. A tunnel has been run about 30 ft and has cut through several seams of ore yielding good assays. The work in the winze, and thus far at the station, has been of a development is progressing favorably.

Eureka District.

EUREKA TUNNEL.—*Eureka Sentinel*, Feb. 23: There are considerable good ore and screenings awaiting shipment at the Eureka tunnel, but the snow in the canyon is too deep to think of taking the teams up to remove it. In the mine the prospect is exceedingly good, but the capital necessary to do the required dead work is wanting. Foreman Maxwell is doing as well as can be expected with his small force of men. He has made a connection from the north drift that was run a long time ago from the 60-foot point in the vertical winze from the south winze to the north Addison chamber. Here is where the principal prospecting is being done and where the best developments are being made. Ore is being extracted from an exceedingly good-looking vein of yellow carbonate, making downward at an angle of about 55 degrees, the thickness of which, at present, is about two ft. A short distance from this is another vein in course of development, the ore lying rather flat and looking like an exceedingly good prospect. Out of all this ore there come some very rich

chloride and black metal, similar to heavy rich ore formerly taken from the Addison chamber. Very little prospecting is being done in the bottom levels, but the character of the ground and the indications are sufficient to justify the use of capital for development.

Grantsville District.

NOT ABANDONED.—*Grantsville Bonanza*, Feb. 23: Grantsville has been under a cloud for over two years, and tempest tossed, but none of its mines are abandoned nor are they likely to be. There will be a resumption of mining operations on an extensive scale as soon as things are arranged to suit the parties owning the leading mines in the village. When the Alexander Mining Co. closed down there was ore enough exposed in the mines to run the 40-stamp mill for years. The mines of Grantsville contain immense bodies of low grade ores, and they only need to be properly handled to produce enough pay rock to keep 200 stamps pounding steadily; then, instead of Grantsville being almost the deserted village that it is, hundreds of men would find employment delving in its hills. Unfortunately we cannot force prosperity. The few people that have remained with Grantsville have unbounded faith in the mines, for they know that with proper management handsome returns in the shape of silver bricks would be the gratifying results.

Lewis District.

SHIPPING ORE TO UTAH.—*Salt Lake Tribune*, Feb. 23: J. P. Courter, who had charge of several mines at Little Cottonwood, from 1877 to 1878, is in town, and is registered at the Metropolitan. Mr. Courter is an old Nevada miner, having been located there almost constantly since 1863. He is now established at Lewis, Nevada, having in charge the Eagle, Star Grove and Highland mines at that point, which are owned by an Eastern company. He is now here to make permanent arrangements for the shipment of ore from those mines to this city. Shipments have been made from Lewis since December last, but an agent had to be sent with each shipment. Mr. Courter desires to avoid the necessity of sending an agent with every consignment, and will, therefore, secure a regular consignee here, to whom all ore can be regularly sent.

Mount Cory District.

REDUCTION WORKS.—*Esmeralda Herald*, Feb. 23: The Mount Cory reduction works are now completed, and running smoothly. The machinery, leaching vats, and everything connected with the mill is in fine running order, and is a success as far as the limited time of trial has allowed of investigating its operations. About 1,000 tons of ore is on the dump, and the ore teams are hauling as fast as the inclemency of the weather and deep snow will permit. It is hoped and expected that it will be a thorough success for the company, and also for this part of the country.

ARIZONA.

MOHAVE Co.—*Miner*, Feb. 20: Our miners don't worry now whether the quartz mills in this county run or not. The Atlantic & Pacific railroad has made them independent of the mills. The millmen will have to knuckle down to the miners now that the boot is on the other foot. There are two mills running in Mohave at the present time, not counting the sampling mill at Kingman which can get away with more ore than a 40 stamp mill and which is kept running all the time. Louis Davidson has bought out Robert D'Yhr's interest in the Oro Fino mine for \$450. Louis will be a millionaire yet.

JUBILANT.—*Arizona Miner*, Feb. 26: The late almost unprecedented storms of rain and snow have made placer miners jubilant. The hydraulic diggings on lower Lynx Creek, under the superintendency of W. H. Jones, are turning out an abundance of yellow wealth, and we hear that more than a hundred prospectors are working the gravel beds of the famous "Rich M'n" or Antelope Hill, in Weaver district and that a great deal of gold is being found in them. Although the late storms have been a serious drawback to some mining enterprises causing them to shut down temporarily on account of blockaded roads and the difficulties of transportation, yet upon the whole the people have cause to congratulate themselves on the prospects of the coming season. We hear that the roads to the United Verde mines are badly damaged, which will necessitate the temporary shutting down of the smelter on account of insufficiency of coke. The damage is of a temporary nature, however, and will not materially affect the most productive mining enterprise in the territory. Very little is being done with the mines in the Hassayampa mountains and on Turkey Creek on account of snow.

COLORADO.

THESEVEN-THIRTY MINE.—*Georgetown Courier*, Feb. 20: The work of development is being actively pushed on this mine, between 60 and 70 men being employed. Twelve drifts are being run—seven on the east side of the gulch, and five on the west. Of these, the tunnel levels, 180, 240, 310 and 375 feet, all on the east side, show fine seams of ore. The 310 and 375-ft levels east are being run on contract and the ore held in reserve. Sinking the main shaft will not be resumed until more powerful hoisting machinery is erected. Arrangements have been made by the owner, with a company of twelve miners, to push the No. 1 level east continuously during a couple of years, the owner allowing them an extra year in which to extract ore from the stopes so opened, which are 100 ft high. After the work of driving this drift has been paid, the owners take one-fourth of all the mineral produced, and the remaining three-fourths go to the miners. This plan of association has been in vogue in Cornwall, where it is called "Tributing." In some parts of this country the same plan has been adopted and seems to work well. No advance for wages is required from the owner of the property, and a stimulus is given to the miner, estimated to produce one-third more work, by a direct interest in the proceeds of his labor. Pomeroy & Co., lessees on the Dunderberg, recently encountered a six-inch streak of good mineral on the 3d level of the mine. Ten tons of ore has been taken out in two weeks, which runs 200 ozs. silver per ton. Larson, Salene & Co., who took a lease on the Tishomingo lode last week, started up work this week. They are at present engaged in cleaning out the shaft preparatory to sinking and putting up buildings. Levels are being run east and west at a depth of 260 ft in the

Old Settler mine, near Idaho. The ore streak averages from 12 to 18 inches wide, and has maintained its width well so far as the levels have been driven. The Welch, on Leavenworth mountain, has lately been leased to Messrs. Neville & Gilmer, who propose to push the thing ahead as fast as good muscle and their means can do it. Good muscle wins when good grit backs it. Mr. John M. S. Egan, Supt. of the Pay Rock mine, returned from New York last week, and went to Denver on Monday with the inventor of the Huson Tramway. He goes to make arrangements for placing a tramway from the Pay Rock mine to the mill. A party of sub-lessees on the Mendota made a strike last week, over which they are much elated. They commenced sinking a shaft a short time ago, then having six inches of mineral. Last week, at a depth of 32 ft, the vein widened out to about four ft of solid galena. Indications are good for the running of a prospect tunnel into Griffith mountain, to cut the Sonora and Griffith lodes. After it strikes these lodes it will probably be continued into the mountain. The mouth of the tunnel is to be immediately east of Bullock & Strickler's barn.

IDAHO.

MINERAL DISTRICT.—*Weiser Ledger*, Feb. 18: Mr. Burton, who is engaged with Mr. Heagerty in the location and construction of the quartz mill at mineral district, was here on Tuesday, returning to his work on the following day. We are informed by him that the mill will probably be erected at the mouth of Dennett creek, near Snake river. A strong force of men are at work on the road up the creek, but the ground is hard and frost-bitten, and progress slow. A townsite will likely be laid out there, and another has been surveyed near the principal mines. We hear of several business houses soon to be established there. Mr. M. Duffy, one of the owners of the Black Hawk, spent several days here this week. That district has been well represented here of late by Messrs. Flowers, Holcomb, Smith and others. Indications point to lively times among the mines next spring.

COEUR D'ALENE.—*Oregonian*, Feb. 23: A. F. Parker, editor and proprietor of the *Coeur d'Alene Eagle*, at Eagle City, in the Coeur d'Alene mines, is in Portland on business; and knowing that he had spent four months in the mines and was well qualified to form a correct opinion of the resources of that section of the northwest, we obtained the following interesting data in the course of an extended interview: No trail has ever been laid out from any point east of the Coeur d'Alene range of mountains, and the only way to come in from the east is by the way of the Mullan road, and that, like the road over Jordan, is a hard road to travel. Spokane Falls is also making a grand attempt to capture the trade of the mines under pretence that it is the nearest accessible point, but the facts are not so. Fort Coeur d'Alene is the only accessible base of supplies; and Rathdrum, twelve miles distant, is its nearest railroad point, while Spokane Falls is thirty miles distant. From Fort Coeur d'Alene, travelers can either take the Mullan road to the old Mission—distance thirty miles—or they can take the steamers to the same place—distance, sixty-two miles. From Fort Coeur d'Alene to the old Mission by water is a very pleasant trip, and is made without danger, as the waters are so deep that no bottom can be seen for the entire distance. From the Mission, which is really the key to the mines, travelers have another choice of routes. They can either take the Mullan road to Evolution—distance, twenty-one miles—thence over the mountain trail, twenty-two miles to Eagle City, or they may take the route up the north fork to the mouth of Eagle creek, either by boat or trail—distance, forty-five miles. The bulk of the travel to and from the mines has always taken this route, as it is open and passable when the alleged trails to the eastward are blockaded by snow. In short, the mines can only be safely reached from the westward. As to the mines, the permanency of the camp is established beyond a doubt, for enough money was taken out last year from the claims then opened to justify the development of the deeper portions of the creek bottoms, which will require the expenditure of more or less capital and labor to work successfully. But while the extent and richness of the camp have been satisfactorily demonstrated, the claims are not so enormously rich as to justify such a stampede as promises to flock thither this coming season. Of the quartz interests but little is known further than that undeniable rich surface prospects have been discovered, and these discoveries were made so late in the season that sufficient work has not been done to prove whether they are likely to be permanent or not. It is mainly a base metal or galena camp, although what is known as the "mother lode of Pritchard creek" assays very high in gold, and carries largely of black sulphurets. This lode crosses Pritchard creek half a mile above the famous "Widow" claim, and is owned by Harris, Clark and King, and is very favorably situated for working. A great deal of unnecessary exaggeration has been told about the richness of the placer diggings and of the amount of gold already taken out, but a careful estimate of the total production of gold so far will not exceed \$20,000. For the prospector the Coeur d'Alene country offers a most inviting field. Under the generic title of Coeur d'Alene, is included all that region whose main streams are the Coeur d'Alene, the St. Joe, St. Mary's, St. Regis and Pen d'Oreille, with their countless tributaries. Still farther southward and adjoining this promising field for exploration are the northern tributaries of the Clearwater, which are equally inviting and undeveloped. The district in which the mines are situated lies between the north and south forks of the Coeur d'Alene river, and this region, which is the "camp" proper, embraces an area of sixty miles by thirty miles, while outside of this the country is practically a *terra incognita*.

MONTANA.

THE BELL SMELTER.—*Inter-Mountain*, Feb. 23: The Bell smelter, after lying idle for several months pending the sinking of the new shaft and the development of the new ledge from the 400-foot station, resumed operations on last Saturday, and is now making a smooth and successful run. About 600 tons of ore are now at the works, which amount is now being increased daily. It is of fair grade, averaging from 15 to 22 per cent copper and 25 ounces in silver, and is susceptible of profitable

reduction. Under the management of Walter J. King, the smelter will make a creditable run, and regular matte shipments will be made.

THE MOULTON.—*Inter-Mountain*: The condition of the Moulton mine and mill, as well as the financial affairs of the company, are particularly gratifying. It will be remembered that one Bowers, a member of the syndicate which agreed to sink the shaft and erect the mill, did not live up to the contract in regard to the shaft and started up the mill at least six months before the condition of the mine justified so doing, and for no other reason than to get his percentage out of the sale of the mill machinery. The result of this sharp practice was that the mine not being sufficiently developed to supply the required amount of good ore, the mill was often run at a positive loss. To have closed it down would have been disastrous. By active, economical and skillful management, however, the mine gradually gained on the mill, and last fall it became possible to begin the payment of the company's indebtedness. The good work has since continued. With Patrick Clark underground, J. K. Clark to look after the mill and W. A. Clark to supervise the entire enterprise, operations were conducted with such success that the outstanding obligations were met as rapidly as possible and to-day the Moulton company does not owe a cent, has an abundance of good ore in the mine, and is accumulating a surplus.

DRUM LUMMON.—*Cor. Inter-Mountain*, Feb. 23: In the Drum Lummon now everything is in full blast. The huge compressor machinery is in motion, and in all parts of the mine striking hammers and hand drills have been discarded, and compressed air takes the place of muscle. The lower tunnel is rapidly approaching the lode, and not only the inhabitants of this camp, but the Territory at large—and especially ye stockholders—are waiting with almost bated breath to see what the lower tunnel will develop. Should the tunnel strike it one-half as good as above, many there are who will be "fixed," but should fate decree otherwise, hay rope will be in demand in this gulch to tie up much-worn blankets, and "the Coeur d'Alenes or bust" will be the cry. Yet there is enough developed ore in the Drum Lummon to keep thirty stamps busy for several years. It is hoped that the Empire—one of the rich spurs of the Drum Lummon—will change hands this spring, then two big companies will be operating here, to be followed in the near future by more. The pan and settler process for saving fine gold at Gloster has proven a success, and has demonstrated that there are many mines in this region that can be made to pay handsomely by using the same method of reduction.

NOTES.—The Gagnon shaft, upon which sinking was recently resumed from the 500-foot station, has reached a depth of 600 ft, and a crosscut to tap the ledge is now being driven southward from the foot wall. The Liquidator shaft has reached the 300-foot station, and the ledge is now being crosscut.

OREGON.

NOTES.—*Jacksonville Times*: More rain is wanted by the miners, and soon, too. The Cayote creek mines are being worked with a full head of water. Miners in Josephine county have plenty of water and are busily at work. Considerable mining is going on in the Grave creek district, where water is abundant. Simmons, Ennis & Co. have water in their big ditch near Waldo. Work is progressing satisfactorily there. The late storms have enabled many of the miners in these parts to do more or less work; but more rain is necessary for advantageous operations. Wimer & Co. were compelled to shut down their mine near Waldo for a few days last week, owing to the extreme cold weather, but are busily at work again. A large amount of snow lies at the head of the Sterling company's ditch, which will afford quite a run. Supt. Ennis informs us that operations have not been commenced as yet. The Yreka creek mining enterprise having proved a failure after being prosecuted several years, the machinery, tools, etc., are being sold. The diggings can doubtless be purchased cheap, also.

UTAH.

A REVIEW.—*Salt Lake Tribune*, Feb. 23: The tremendous storms have made unprecedented difficulties in the canyons and movement of ore is much restricted. The receipts of bullion and ore in Salt Lake City for the week ending February 20th, inclusive, were \$114,191.47, of which \$109,431.47 was bullion, and \$4,760 ore. This is more than double the receipts of the week previous, but undoubtedly part of this week's returns belong to those of the week before. The shipments from this city for the week ending February 16th, inclusive, were 41 cars of bullion, sent east, 1,029,572 pounds. The Horn Silver shipped during the week, 11 cars of bullion, \$33,000; bringing its total for the year to date, \$276,000. The quarterly dividend announced for February 15th, was duly paid, being the 12th, amounting to 75 cents per share, or \$300,000. Total dividends to that date, \$3,000,000. During the year 1883, the dividends \$1,100,000, and there were sold in New York, 95,592 shares of Horn Silver stock, ranging in price from \$4.60, the lowest, to \$8.63, the highest. The opening price for the year 1883 was \$6.50; the closing, \$6.25. The Ontario product for the week was 21 cars, amounting to \$35,917.94. The ninety-first dividend of the Ontario, amounting to 50 cents per share, or \$75,000, was paid in New York on the 31st ultimo. Total of ninety-one dividends, \$5,225,000. During the twelve months of 1883 there were 10,043 shares of Ontario stock sold in New York, at prices ranging from \$18.00 to \$35.50. The opening price for that year was \$35.50; the closing, \$29.25. Total dividends for 1883, four of \$75,000 each, \$300,000. The Hanauer smelter report for the week shows a product of 21 cars, \$40,514. The Stormont having shut down, there is now no production at Silver Reef. This shutting down is but temporary, however, caused by the high water, and the Stormont will soon resume. The Christy is yet closed down. Capt. Lubbock, in charge of its operations, passed through Salt Lake this week on his way to San Francisco. He reports that his company has large reserves of medium grade ore that will pay, and their prospecting has developed some very encouraging bodies of high grade ore. They will resume active production about June 1st, on a more favorable basis than ever before, the miners having freely consented to such a reduction of their pay as will materially assist the company in making both ends meet.

Mining Share Market.

There is very little life in the stock market, but more attention is given to the Bodie stocks than any others. On the Constock, however, at the old bonanza mines California and Consolidated Virginia—they are fast getting their ground in shape to resume prospecting operations. It has been so long since any prospecting was done in these mines, that all will be glad to see that kind of work resumed.

The Hale and Norcross folks are now about ready to explore their 2800 level and the ground on the levels above where prospecting operations were discontinued on account of water. There is much ground between the 2600 and 2800 levels that was hardly passed through which may now be thoroughly examined. At the Savage they are now in a position to thoroughly explore a large area of ground on the 2600 level.

At Gold Hill all is now going on prosperously at the leading mines. The mills on the Carson river are now running to their full capacity, and full forces of men have been put to work in the mines. It is not likely that the mills will be again frozen up this season. The only thing now liable to stop them is a flood. Should there be a flood in the Carson river, the water might so back up on the wheels as to prevent them from running. The delay from this cause, however, would be very short, as the water in the river would run down in a few hours.

Bullion Shipments.

Ontario, Feb. 20th, \$23,254; Hanauer, Feb. 22d, \$9,800; Crescent, Feb. 22d, \$3,500; Horn Silver, Feb. 22d, \$6,000; Ontario, Feb. 22d, \$9,624; Hanauer, Feb. 24th, \$4,800; Horn Silver, Feb. 24th, \$6,000; Ontario, Feb. 24th, \$4,368; Syndicate, Feb. 23d, \$6,995; Bonanza King, Feb. 25th, \$9,707; Navajo, Feb. 24th, \$5,000; Bodie, Feb. 20th, \$32,682; Standard, Feb. 23d, \$13,817; Bonanza King, Feb. 26th, \$9,195.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

San Francisco Metal Market.

WIRELESS.		THURSDAY, Feb. 28, 1884.	
WESTERN Per pound.	14	05	5
IRON American Pig, soft, ton.	30	00	00
Scotch Pig, ton.	21	00	28 50
American White Pig, ton.	23	00	33 50
Oregon Pig, ton.	23	00	33 50
Copper Bar, No. 1 to 4.	32	50	35 00
Reinforced Bar.	31	00	33
Thorpe's, keg.	5	50	00
N. Rod.	7	00	00
N. Rod, according to thickness.	6	00	00
Steel, English Cast, lb.	14	00	15
Black Diamond, ordinary sizes.	14	00	00
Drill.	15	00	16
Machinery.	12	00	14
Copper Ingot.	22	00	00
Braziers' sizes.	31	00	00
Pipe-box & bolts.	31	00	00
Nails.	17	00	00
Bolt.	31	00	00
Old.	31	00	00
Bar.	31	00	00
Cement, 100 lbs.	12	00	00
LEAD Pig.	4	00	00
Bar.	5	00	00
Pipe.	7	00	00
Sheet.	8	00	00
4 bot, discount 10% on 500 bags.	2	10	00
Back, Pig bag.	2	10	00
Chilled, do.	2	10	00
TIN PLATES—Charcoal.	6	00	6 50
Coke.	5	50	5 75
Bancroft.	24	00	00
Australian.	21	50	00
1. Charcoal.	5	50	6 00
ZINC—By the cask.	19	00	00
Sheet, 7x3 ft, 7 to 10 lb, loss the cask.	9	00	00
N. LBS—Assorted sizes.	3	30	4 75
QUICKSILVER—By the flask.	34	00	00
Flasks, new.	1	05	00
Flasks, old.	85	00	00

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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L. M. LEMAY—San Bernardino and San Diego counties.
J. J. BARRELL—Sacramento county.
C. E. CURTIS—Kern and Fresno counties.
C. S. DENNIS—San Mateo county.
A. C. KNOX—Chama, Yuba and Yolo counties.
F. M. THOMAS—Fresno county.
ED. MACK—Santa Clara county.

Lost Papers.

If any subscriber fails to receive this paper promptly, after making due inquiries at the Postoffice, he is urgently requested to notify this office by letter, that we may send the missing papers, and, if possible, guard against further irregularities.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walked with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alaska M Co.	California.	4	2,400.	Feb. 6, Mar. 8.	Mar. 28.	A. Judson.		320 Sansome st.
Alpha Hydraulic M Co.	California.	5	25.	Jan. 25, Mar. 25.	Apr. 25.	P. M. Scott.		326 Montgomery st.
Alta M Co.	Nevada.	28	25.	Jan. 25, Mar. 3.	Mar. 24.	W. H. Watson.		302 Montgomery st.
Alpha Con M Co.	Nevada.	17	50.	Jan. 4, Feb. 11.	Mar. 5.	W. Willis.		309 Montgomery st.
Almont M Co.	Nevada.	36	75.	Feb. 20, Mar. 31.	Apr. 30.	J. W. Pew.		310 Pine st.
Blue Bluff Gravel M Co.	California.	5	92.	Jan. 17, Feb. 25.	Mar. 14.	J. Stauffelt.		419 California st.
Bodie Con M Co.	California.	4	50.	Dec. 21, Jan. 30.	Feb. 29.	G. W. Sessions.		309 Montgomery st.
Benton Con M Co.	Nevada.	12	20.	Feb. 5, Mar. 11.	Mar. 21.	W. H. Watson.		302 Montgomery st.
Bell & Belcher M Co.	Nevada.	28	50.	Feb. 5, Mar. 14.	Apr. 2.	W. Willis.		309 Montgomery st.
California M Co.	Nevada.	10	20.	Jan. 4, Feb. 11.	Mar. 8.	C. P. Fryson.		302 Montgomery st.
Calaveras M Co.	Mexico.	8	10.	Jan. 9, Feb. 15.	Mar. 17.	W. J. Taylor.		220 Sansome st.
Excelsior Water Co.	California.	6	50.	Jan. 23, Mar. 1.	Mar. 21.	A. D. Weston.		215 Sansome st.
Elmer & Co. Gravel M Co.	California.	14	50.	Jan. 8, Feb. 27.	Mar. 18.	H. Kinn.		209 Sansome st.
Eureka Con M Co.	Nevada.	7	1,000.	Jan. 15, Feb. 18.	Mar. 19.	H. H. Wilson.		309 Montgomery st.
Goodwin M Co.	California.	15	10.	Jan. 15, Feb. 12.	Mar. 3.	C. C. Harvey.		302 California st.
Hale & Norcross M Co.	Nevada.	80	50.	Jan. 15, Feb. 19.	Mar. 13.	F. F. Lightner.		304 Montgomery st.
Lead Center M Co.	Arizona.	4	10.	Jan. 23, Mar. 4.	Mar. 26.	J. W. Pew.		310 Pine st.
Indian Spring Gravel M Co.	California.	1	30.	Feb. 18, Mar. 22.	Apr. 19.	A. B. Paul.		320 Montgomery st.
Jupiter Deep Blue Gravel M Co.	Cal.	1	1,000.	Dec. 17, Feb. 16.	Mar. 16.	Montgomery & Lundy.		426 California st.
Lafayette M Co.	Mexico.	5	50.	Feb. 23, Mar. 25.	Apr. 10.	H. G. Jones.		322 Pine st.
Morrill Con M Co.	California.	1	10.	Jan. 24, Feb. 19.	Mar. 12.	J. J. Daneman.		436 Montgomery st.
Milton M Co.	California.	1	100.	Feb. 14, Mar. 24.	Apr. 11.	H. Pichler.		320 Sansome st.
Mammoth Bar M Co.	California.	4	15.	Jan. 14, Feb. 21.	Mar. 10.	J. W. Pew.		310 Pine st.
Nartin White M Co.	Nevada.	17	25.	Dec. 21, Feb. 7.	Mar. 7.	J. J. Seville.		309 Montgomery st.
Marshall M Co.	California.	1	10.	Jan. 14, Feb. 23.	Mar. 12.	R. W. Wagoner.		414 California st.
New Cuso M Co.	California.	17	40.	Jan. 13, Feb. 28.	Mar. 31.	E. B. Clement.		710 Washington st.
Northern Belle.	Nevada.	2	800.	Jan. 30, Mar. 10.	Apr. 4.	W. Willis.		309 Montgomery st.
Opfir M Co.	Nevada.	46	50.	Feb. 2, Mar. 6.	Mar. 26.	E. B. Holmes.		309 Montgomery st.
Potosi M Co.	Nevada.	14	50.	Jan. 15, Feb. 29.	Mar. 13.	W. E. Dean.		309 Montgomery st.
Pinal Con M Co.	Arizona.	5	10.	Dec. 15, Feb. 15.	Mar. 14.	A. Adler.		309 Montgomery st.
Rainbow M Co.	California.	9	20.	Jan. 3, Feb. 5.	Mar. 6.	J. S. Jordan.		311 Montgomery st.
Savage M Co.	Nevada.	58	50.	Feb. 5, Mar. 10.	Mar. 31.	E. B. Holmes.		309 Montgomery st.
Sierra Nevada S. M. Co.	Nevada.	78	100.	Jan. 15, Feb. 29.	Mar. 17.	E. L. Parker.		309 Montgomery st.
San Miguel & Trinidad M Co.	Mexico.	4	50.	Jan. 11, Feb. 19.	Mar. 10.	C. G. Brooks.		210 Front st.
Union Gravel M Co.	California.	18	50.	Jan. 18, Feb. 26.	Mar. 18.	H. Pichler.		320 Sansome st.
Utah M Co.	Nevada.	47	1,000.	Jan. 4, Feb. 11.	Mar. 3.	G. C. Pratt.		309 Montgomery st.
William M Co.	California.	1	25.	Feb. 13, Mar. 28.	Apr. 28.	R. Elton.		310 Pine st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
El Dorado M Co.	California.	J. H. Sayre.	320 Pine st.	Annual.	Mar. 10
Gold Lead M Co.	Nevada.	J. Brown.	309 Montgomery st.	Special.	Mar. 6
Hale & Norcross M Co.	Nevada.	F. Lightner.	304 Montgomery st.	Annual.	Mar. 12
Potosi M Co.	Nevada.	W. E. Dean.	309 Montgomery st.	Annual.	Mar. 12
Red Hill Hydraulic M Co.	California.	E. Hestres.	328 Montgomery st.	Annual.	Mar. 6
Sierra Nevada M Co.	Nevada.	J. L. Fields.	330 Pine st.	Annual.	Mar. 11

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Feb. 15
Bulwer Con M Co.	California.	W. Willis.	309 Montgomery st.	10.	Jan. 20
Constock Con M Co.	Arizona.	D. C. Bates.	309 Montgomery st.	25.	Jan. 12
Deerhoe Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery st.	4.00.	Jan. 4
Deerhoe M Co.	California.	W. Willis.	309 Montgomery st.	10.	Dec. 4
Jackman M Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Jan. 4
Kentuck M Co.	Nevada.	J. W. Pew.	Pine st.	10.	Feb. 19
Mc Dianna M Co.	Nevada.	R. W. Heath.	Pine st.	25.	Nov. 26
Sierra Nevada S. M. Co.	Nevada.	W. E. Dean.	309 Montgomery st.	25.	Nov. 26
Silver King M Co.	Arizona.	J. Nash.	315 California st.	25.	Dec. 15
Syndicate M Co.	California.	J. Stauffelt.	419 California st.	10.	Feb. 5

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 6.	WEEK ENDING Feb. 14.	WEEK ENDING Feb. 21.	WEEK ENDING Feb. 28.
Alpha.	1.00	2.00	1.70	1.75
Alta.	1.30	1.90	1.70	1.85
Andros.	.40	.45	.35	.30
Argenta.	.05	.10	.05	.10
Atlas.	.90	1.05	.90	.95
Belcher.	.90	1.05	.90	.95
Belding.	.25	.30	.25	.30
Bell & Belcher.	2.25	2.30	2.50	2.40
Bullion.	.90	.90	.90	.90
Bechtel.	.35	.40	.35	.40
Belle Isle.	.15	.20	.15	.20
Bodie Con.	.35	.50	.20	.25
Benton.	.35	.50	.20	.25
Bodie Tunnel.	.95	1.10	.95	1.10
Caledonia.	.20	.25	.20	.25
California.	.20	.25	.20	.25
Challenge.	2.05	2.15	2.05	2.15
Chollar.	2.05	2.15	2.05	2.15
Confidence.	.90	1.00	.90	1.00
Con. Imperial.	.20	.25	.20	.25
Con. Virginia.	.90	1.25	.90	1.25
Crown Point.	1.00	2.00	1.00	2.00
Day.	1.00	2.00	1.00	2.00
Elko Con.	1.85	2.15	1.70	2.25
Eureka Con.	1.85	2.15	1.70	2.25
Eureka Tunnel.	.40	.45	.35	.30
Excelsior.	.15	.20	.15	.20
Grand Prize.	.15	.20	.15	.20
Gould & Curry.	1.60	1.90	1.80	1.75
Hale & Norcross.	1.45	1.60	1.50	1.45
Holmes.	1.10	1.25	1.10	1.25
Independence.	.30	.40	.35	.40
Jeha.	.25	.30	.25	.30
Justice.	.25	.30	.25	.30
Jackman.	.25	.30	.25	.30
Kentuck.	.25	.30	.25	.30
Lead Center.	.50	.70	.50	.70
Martin White.	1.35	2.00	1.45	2.00
Mon.	2.30	2.50	2.30	2.50
Mexican.	2.30	2.50	2.30	2.50
Mt. Diablo.	2.70	2.70	2.70	2.70
Mt. Potosi.	2.70	2.70	2.70	2.70
Noonday.	.10	.30	.05	.05
Northern Belle.	2.25	2.25	2.30	2.25
North Noonday.	.25	.30	.25	.30
North Belle.	.25	.30	.25	.30
Occidental.	1.45	2.25	1.50	1.10
Opfir.	.30	.30	.30	.30
Overman.	.30	.30	.30	.30
Potosi.	.60	.70	.45	.65
Pinal Con.	.70	.80	.45	.70
Savage.	.70	.80	.45	.70
Sec. Belcher.	2.40	2.80	2.20	2.45
Sierra Nevada.	.05	.10	.10	.10
Silver Hill.	.60	.60	.60	.60
Silver King.	.25	.50	.25	.40
Scorpion.	.25	.50	.25	.40
Tuscarora.	2.30	2.85	2.55	3.25
Union Con.	1.00	2.05	1.85	2.10
Wales.	2.30	2.85	2.55	3.25
Utah.	2.30	2.85	2.55	3.25
Ward.	2.30	2.85	2.55	3.25
Yellow Jacket.	2.25	2.50	2.40	2.50

Sales at San Francisco Stock Exchange

THURSDAY, Feb. 28.	500	Argenta.	.05c
330 Alta.	2.10	340 Bodie Con.	.20c
250 Bulwer.	1.75	150 Bodie Con.	.20c
200 B. & Belcher.	2.40	200 Bodie Con.	.20c
690 Bodie Con.	1.05	300 Bodie Con.	.20c
50 Chollar.	2.45	100 Con. Virginia.	.15c
200 Con. Pacific.	.45c	100 Con. Virginia.	.15c
20 Crown Point.	1.10	125 Eureka Con.	.30c
150 Con. Virginia.	.50c	200 Excelsior.	.40c
100 Eureka Con.	.30c	190 Gould & Curry.	1.85c
105 Gould & Curry.	1.85c	74c Hale & Nor.	.25c
250 Grand Prize.	.15c	200 Justice.	.15c
350 Hale & Nor.	.25c	25 Mt. Diablo.	.25c
100 Julia.	.15c	190 Mexican.	.25c
100 Justice.	.15c	475 Mon.	.15c
100 Mon.	.15c	250 Nevada.	.25c
100 Nevada.	.25c	25 Overman.	.30c
250 Ohfir.	1.55c	50 Occidental.	.12c
250 Potosi.	1.20c	100 Ohfir.	.15c
1200 Syndicate.	.90c	150 Potosi.	.12c
100 Toga.	.30c	250 Savage.	.80c
150 Utah.	.22c	200 Syndicate.	.85c
370 Union Con.	3.10c	40 Scorpion.	.45c
30 Yellow Jacket.	2.60c	200 Utah.	3.05c
1500 Alta.	1.75c	60 Yellow Jacket.	.25c

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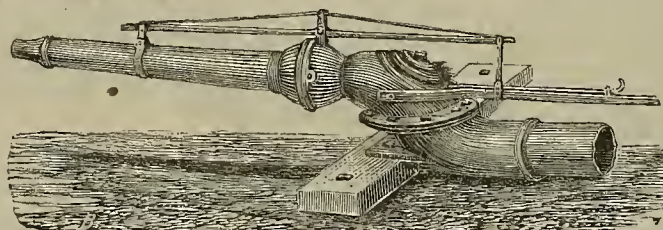
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Ingersoll, E, 3 1/2", medium ports.....	1,601	" "
National, improved, 3 1/2".....	1,280	" "
Rand, improved, 3 1/2".....	1,041	" "
Ingersoll, D2 3", beat Rand 3 1/2".....	744	" "
Ingersoll, D2 3", beat National 3 1/2".....	505	" "
Ingersoll, E 3 1/2", beat Rand 3 1/2".....	560	" "
Ingersoll, E 3 1/2", beat National 3 1/2".....	321	" "
National beat Rand.....	139	" "

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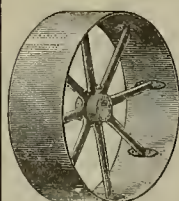
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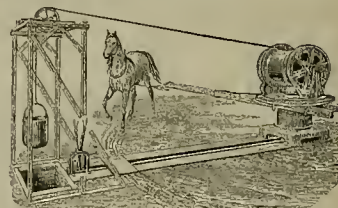
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Our Home Industries.

(CONCLUDED FROM PAGE 160.)

the country increased 59 per cent, the added or industrial value of manufactured goods increased 130 per cent.

The Tariff.

It was on March 2, 1861, that the Morrill Tariff Bill became a law, going into effect 1st of April, same year; this bill cannot therefore be said, in any sense, to have been a war measure, but it was the beginning of the policy of charging import duties on foreign-made goods, to create a revenue and to protect home manufacturing. Imperfect as that tariff bill was, as all such tariff bills must necessarily be, the effect has been to call into active life innumerable industries, and to give employment to such a vast army of skilled workmen, with the result of such great wealth and power to the country at large, as is shown by the figures I have read to-night. Some of the industries thus created may be able to stand a partial withdrawal of that protection, but this must be done with the utmost care and caution.

Horticulturists sometimes take certain plants that are raised in a hot-house, and gradually expose them to a lower temperature until they are able to live in the open air, but this is an experiment very often resulting in death to the plant, after a struggling and painful existence during the process of hardening.

Last year the tariff was reduced and readjusted, and many of the industries, notably the iron interest, are suffering to-day from that cause; and now Representative Morrison comes in with an "Act to Reduce Import Duties and War Tariff," by which he proposes to make a general reduction of 20 per cent; the effect of such a sweeping reduction cannot fail to be disastrous. I beg, therefore, to call your attention to the proposed bill, which has already been referred to the Committee on Ways and Means in the House.

I wish only to add that all matters affecting the manufacturing interests of California in particular should be your special care if we expect to keep this State in a prosperous condition. Let us be in earnest in our efforts to provide employment for her mechanics and workmen, at remunerative wages. Let us offer the open hand of fellowship to all who start new or duplicate old industries in this State. We do not propose to be any man's or any firm's champion, but to champion the industrial interests of the State at large, and to do our utmost to build up a prosperous, industrious, law-abiding people in this young, glorious and free State of California.

BY-LAWS

Of the Manufacturers' Association of California.

The following is a complete copy of the By-Laws of the Manufacturers' Association of California, and all amendments, including that adopted at the meeting held last week:

1. The corporate name and title of this Association shall be the Manufacturers' Association of California.
2. The principal place of business of the Association shall be in the City and County of San Francisco, in the State of California.
3. The designs and objects of this Association shall be the fostering, encouraging, developing and protecting of the home industries and the manufacturing interests of the State of California and especially of the members of this Association.
4. The term of existence of this Association shall be fifty years from and after the filing of the Certificate of Incorporation.
5. The affairs of this Association shall be managed by a Board of eleven Directors, who shall be residents of the State of California, and who shall be elected annually, by the members in person voting by ballot on the first Monday in November in each year.
6. Immediately after the result of the election shall have been declared, the Directors shall organize by electing from their members a President, a Vice-President and Treasurer.
7. As soon as organized, the Board of Directors may elect such other officers and employees as the business of the Association may require.
8. The duties of each officer of the Association are such as pertain or attach by law or custom to the office.
9. The Association shall have a seal, the device being a circle with the words "Manufacturers' Association of California," surrounding the words: "Incorporated November 13th, 1883."
10. All vacancies in the Board of Directors occurring between the annual elections, shall be filled by a majority of the remaining members of the Board.
11. The Board of Directors shall at their first meeting and as often thereafter as they may deem it necessary, require and exact from the Secretary and Treasurer, or from any other officer of the Association, when they so decide, bonds for the faithful performance of their duties. The amount of said bonds shall be fixed by them, and lowered or increased at any time as in their judgment they may deem advisable or proper.
12. The members of this Association shall be those who are actually engaged in manufacturing in the State of California.
13. All persons or firms engaged in manufacturing business within the State of California, are eligible to become members of this Association. (Amendment Adopted, February 21, 1884.)
14. Whenever a member ceases to be a manufacturer or identified with manufacturing, his membership shall cease and shall be so declared by the Board of Directors.
15. Persons otherwise eligible may become life members of this Association on complying with Arti-

cle 17, and by the payment of two hundred and fifty dollars. After election shall be exempt from the operations of Articles 12, 13 and 14.

16. The Association may elect honorary members from among those who have been active member of this Association, and who may have retired from business, or from distinguished persons who have been prominently identified with the manufacturing interests of the country, with all the privileges of the Association except the right to vote or hold office.

17. All applicants for membership must sign these By-Laws, pay the fees and dues, and be approved by the Board of Directors before they can be admitted to this Association as members. Two negative votes in the Board of Directors shall be equivalent to a rejection of the applicant.

18. The membership dues shall be as follows: Entrance fee, twenty dollars, payable on admission, and twenty dollars per annum, payable in quarterly installments of five dollars, to be paid in advance on the first day of November, February, May and August of each year.

19. Failure to pay quarterly dues for six months shall entail forfeiture of membership.

20. All entrance fees and life membership subscriptions shall be set aside as a Building Fund, and invested in safe securities, yielding not less than four per cent per annum, until the Association shall have erected and paid for a building adapted to its requirements.

21. The Board of Directors shall meet monthly at such day and hour as it shall determine.

22. There shall be an annual meeting of the Association on the second Monday of November, when the final condition of the Association shall be exhibited; the reports of the officers and address of the President shall be read.

23. Five days' notice by letter through the post-office addressed to each member shall be given of any meeting of the Association.

24. The voluntary absence of any Director from three consecutive regular meetings of the Board, shall be equivalent to a tender of his resignation as a Director.

25. Special Meetings of the Board of Directors or of the Association, may be called at any time by the President.

26. The President shall call a Special Meeting of the Association on the written request of ten members.

27. At all meetings of the Association fifteen members shall constitute a quorum.

28. These By-Laws may be amended by a two-thirds vote of the members present, at a meeting of the Association called for that purpose; notice and copy of the proposed amendments having been mailed to each member and posted in a conspicuous position in the rooms of the Association at least one month previous to such meeting, and it shall be the duty of the Secretary to carry out the provisions of this Article.

The Board of Directors of the association is as follows: A. S. Hallide, President; I. M. Scott, Vice-President; N. W. Spaulding, Treasurer; George C. Hickox, Secretary; W. T. Garratt, A. Haraszthy, Wm. Harney, D. Kerr, S. P. Taylor, A. Tubbs, A. H. Phelps, I. Hecht, Executive Committee—W. T. Garratt, A. H. Phelps, A. Haraszthy, Finance Committee—I. Hecht, D. Kerr, Wm. Harney.

The Board of Directors of the Association have recently appointed as permanent Secretary Mr. George C. Hickox, a gentleman well known in this community as banker, broker and expert business man. Mr. Hickox has an enviable reputation as an energetic, pushing man, who puts his whole soul into any work he undertakes. It is part of his duty to collect statistics and information for the benefit of the manufacturers belonging to the Association, and he will make an energetic canvass and get all the manufacturers to join the organization.

THE GOLD RUN MINING CASE.—The case of California vs. the Gold Run Mining Company, is being argued before the Supreme Court. The action was brought by the Attorney-General of the State in June, 1881, against the Gold Run Mining Company of Placer county, alleging that the defendants and other companies, engaged in hydraulic mining, were filling the Sacramento river, and thereby committing a public nuisance; and also that private property had been destroyed in the past, and would be jeopardized in the future. The defendants denied the allegations in detail, and said that, having acquired their property by purchase from the United States and operated it for a long period of years by the method complained of, they had a sanction from the United States government, and by various statutes and decisions of the Legislature and courts of the State, that it constituted a license. The case was heard before Judge Temple at Sacramento, November 18, 1881, and occupied until March, 1882. On June 12, 1882, Judge Temple rendered his decision, which has been known in this litigation as the "Temple decision." The appeal to the Supreme Court was mutual with the principals in the suit, the miners not being satisfied with the part of the decision relating to the construction of the dam, and the Anti-Debris Association not agreeing with the court in its giving the miners permission to work.

MR. HORATIO C. BURCHARD has been re-appointed Director of U. S. Mints. This appointment signifies an end of the dispute as to affairs in the Mint at San Francisco, which arose over the disagreements between Burchard and Superintendent Charles H. Burton.

THERE will be railroad connection with the City of Mexico in about three weeks.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING FEBRUARY 5, 1884.

- 292,987.—SELF SHIPPING BELT PULLEY—H. P. Christie, S. F.
 292,992.—ALARM SIGNAL FOR HOT JOURNALS—Cornelius & Turner, Turner, Ogn.
 292,990.—VEHICLE GEAR—W. A. Dawson, Stony Point, Cal.
 292,910.—CAR COUPLING—J. M. Harper, Colfax, W. T.
 292,932.—STEP LADDER—E. Markwick, Pinkney, Cal.
 293,069.—HYPOTENUSE CALCULATOR—Dan'l Paten, Calistoga, Cal.
 293,087.—HORSE POWER—A. Robinson, Benicia, Cal.
 293,093.—SCARF RETAINER—J. Sandilands, S. F.
 293,104.—SPADING MACHINE—D. F. Spangler, Santa Ana, Cal.
 293,130.—SAW—Geo. W. Wills, Portland, Ogn.
 293,208.—GRASS COLLECTOR FOR LAWN MOWERS—J. H. Wymms, Oakland, Cal.

FOR WEEK ENDING FEBRUARY 19, 1884.

- 293,931.—TABLE FOR MANUFACTURE OF CANDY—C. A. Alisky, Portland, Ogn.
 293,841.—FRUIT PITTING MACHINE—Chas. Allison, S. F.
 293,932.—DREDGER—H. B. Angell, S. F.
 293,627.—FIRE ESCAPE—S. D. Butler, Marshfield, Ogn.
 293,853.—PORTABLE RAILWAY—John Dolbeer, S. F.
 293,955.—WOOD PRESERVING COMPOUND—H. C. Dorr, S. F.
 293,899.—CAR COUPLING—John Martin, Knights Ferry, Cal.
 293,667.—SURVEYORS' TRANSIT—Thomas L. Nixon, New Tacoma, W. T.
 293,984.—ADJUSTABLE WRENCH—A. B. Smith, S. F.
 293,832.—REFRIGERATING CAR AND APPARATUS FOR SHIPPING MEAT—H. S. Widman, S. F.
 3,297.—LABEL—Wells & Church, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

REFRIGERATING CAR AND APPARATUS FOR SHIPPING MEAT.—Henry G. Widman, S. F., Cal. No. 293,832. Dated Feb. 19, 1884. This invention relates to a new and useful improvement in transporting or shipping meat from the slaughter-house to the market. The practice has been usually, after slaughtering the animals, to quarter them and pack them into cars. This practice was designed to overcome the undesirable features of transporting live animals; but to the present practice of transporting "quarters" there are also objections, principally lying in the appearance of the meat upon arriving at its destination. When quartered but he flanks shrink and spoil in shape, and the meat does not look clean and healthy as when first slaughtered. Again, it needs handling, and when packed is apt to heat. Mr. Widman's invention is designed to overcome these difficulties by enabling him, after slaughtering the animals and dressing them while hanging on the gambrels, to run the carcasses entire into the car, and transport them still in a suspended condition to the market, where they arrive in good condition, just as they were slaughtered. The invention consists therefore in the improvement in shipping meat from the slaughter-house to market, consisting in packing carcasses entire in the car. It further consists in the means which enable the inventor to accomplish this result to the best advantage—namely, in getting as many as possible into the car, thus utilizing its full capacity, and in doing this without handling the meat.

PORTABLE RAILWAY FOR LOGGING PURPOSES.—John Dolbeer, S. F. No. 293,853. Dated Feb. 19, 1884. This improved construction of railways consists of stringers with transverse timbers framed into them to hold them together, and having rails bolted to them to form complete sections in straight lines and curves, and their ends so formed that any of the sections may be abutted and secured together to form a continuous line of railway with regular or reversed curves at any desired points. This railway is specially designed to be used in rough, mountainous and wooded land where it is desirable to get out logs for milling purposes. In such localities it is customary to build roads over which the logs may be hauled upon wagons and trucks; or what are known as skid-roads are built by laying logs transversely at intervals of four to eight feet, so that the log can be drawn across these fixed skids. Both of these roads are comparatively expensive for the short time they are needed, and new ones must be built whenever the timber in any locality is exhausted. This new railway is formed in solid sections with all necessary curves, suitable to be laid on the ground, with only the work of partial leveling and without any gravel or complete filling or grading so that logging engines and cars

may be run over it into any locality, and when the timber is exhausted, the sections may be taken up by a derrick upon a car and transported to another point and re-laid complete.

CAR COUPLING.—John Martin, Knights Ferry, Stanislaus Co., Cal. No. 293,899. Dated Feb. 19, 1884. This is an improvement in that class of car couplings in which swinging latches on each draw-head are adapted to fall into engagement with the ends or beads of the coupling pin. The invention consists in a peculiarly constructed draw-head chamber, in a staple secured to the under side of the gravitating latch, adapted to receive and throw out the coupling pin when necessary, and in the means for raising the latches from above or on the side to uncouple the cars. The object of the invention is to provide a simple and effective automatic car coupling which shall be able to readily uncouple itself in case of accident, or be easily uncoupled by design.

FRUIT CUTTER AND PITTER.—Chas. Allison, S. F. No. 293,841. Dated Feb. 19, 1884. This invention consists in opposing V-shaped knives, inclosing a space for the reception of the fruit, and adapted to cut the meat to the pit, a thimble or band in the angle of each cutting edge for retaining the pit, and a flexible line for wrapping around each half of the fruit and cutting it from the pit. The machine, while applicable, for any kind of fruit having pits or stones, is particularly designed for use in preparing peaches, and more especially "clingstones," in which the meat adheres to the stone so tenaciously that it is difficult to release it.

The Lien Lands.

WASHINGTON, February 26th.—The Lien Land bill was reached in regular order on the calendar of the Senate to-day, and, after a debate of a few minutes, was amended and passed. The bill recently introduced by Senator Miller was not considered, and the substitute for Senator Farley's bill, introduced December 18, 1881, was passed in its place. The substitute was originally prepared by Senator Van Wyck, and was reported to the Senate on March 21, 1882. Senator Plumb, of Kansas, pressed it to-day as a substitute for the Miller-Glasscock bill. As passed by the Senate to-day, the bill reads as follows:

That an Act entitled "an Act to provide for the survey of public lands in California, the granting of pre-emption rights therein and other purposes," approved March 3, 1853, was intended to give to the State of California the right to select for school purposes other lands in lieu of such sixteenth and thirty-sixth sections as may have been or shall be found to be mineral lands, provided that such indemnity selections shall be made under the limitations contained in said Act from surveyed public lands of the United States in the State of California, subject to entry under the general laws, and not mineral nor occupied by actual settlers, nor reserved for any purpose, nor appropriated under any law of the United States.

The bill was sent to the House this afternoon. It will be considered by the Public Lands Committee before the House will act on it.

News in Brief.

SACRAMENTO has four hundred saloons.

THE Harper High License law of Chicago has been declared constitutional by the Supreme Court of that State.

THE Governor of Michigan gives petitions for pardons full publicity before he takes any other action in regard to them.

ORDERS have been received at Mare Island Navy Yard to fit out the schooner Ounalaska for further explorations of Alaska.

THE widow of A. T. Stewart sold the Stewart building on Broadway and Chamber street, New York, to Judge Hilton, for \$2,100,000.

THE British House of Lords has passed the bill for the better prevention of the introduction of foot and mouth disease by foreign cattle.

THERE are indications that Congress will refuse to make appropriations for printing \$1 and \$2 greenbacks. This course will be for the purpose of forcing silver dollars into circulation.

THE Visalia Delta estimates that 30,000 acres of virgin soil will this year be sown to grain in the country irrigated by the Seventy-six canal, which will yield at a low calculation, 300,000 sacks of wheat.

COL. A. ANDREWS, of this city, has been appointed by President Arthur as Representative for California at the World's Industrial and Cotton Exposition, to open in New Orleans in December next.

SARCENT is the object of much sympathy on the part of members of the German Chamber of Deputies and other persons of note, who express disapproval of the attacks made upon him by the conservative press.

THE Fire Underwriters of the Pacific coast have resolved not to grant, in any policy they may hereafter issue, permission for keeping fireworks, fire-crackers or explosive bombs in any place where they accept insurance.

A LONDON dispatch says: The wine merchants are badly off, owing to the decrease in the consumption of all wines except claret and champagne, but the whisky trade flourishes. A Scotch train the other day consisted of 24 cars laden entirely with whisky.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

ASSESSMENT NOTICE.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador county, near Drytown, California.

NOTICE is hereby given, that at a meeting of the Directors, held on the 29th day of January, 1884, an assessment (No. 44) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 402 Front street, room 8, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 12th day of March, 1884, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 10th day of April, 1884, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

MARK T. ASHBY, Secretary.

OFFICE—No. 402 Front Street, Room 8, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, February 2, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 64, of twenty-five cents (25c.) per share, was declared, payable on TUESDAY, February 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.

OFFICE—Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

DOWNIE

EUCALYPTUS BOILER SCALE

Preventive and Remover.

(Patented May 8, 1883.)

In use in 1,000 Boilers on Steamboats, Locomotives, Mills, Mines, Foundries, etc., in California. An

Infalible Preventive and Remover of Scale

Prevents the iron from rusting or pitting. Shipped in ten gallon cases at 50 cents per gallon, by

DOWNIE B. I. P. CO.,

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Extra inducements will be offered for a few active canvassers who will give their whole attention (for a while at least) to soliciting subscriptions and advertisements for this journal and other first-class popular newspapers. Apply soon, or address this office, giving address, age, experience and reference.

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No. 252 Market St., S. F.

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I. A. HEALD, Proprietor.

Mining Books.

Orders for Mining and Scientific Books in general will be supplied through this office at published rates.

J. J. STAPLES, Pres't.
ALPHEUS BULL, V.-Pres't.

INSURE IN THE

WILLIAM J. DUTTON, Sec'y.
E. W. CARPENTER, Asst. Sec'y.

FIREMAN'S FUND

INSURANCE COMPANY OF CALIFORNIA.

Assets Dec. 31, 1883, \$1,473,025.76
Losses Paid, Over \$5,000,000.00

ASSETS AND PREMIUM INCOME LARGEST OF ALL THE COMPANIES ORGANIZED WEST OF NEW YORK STATE.

By charging Adequate Rates for its Policies, it is enabled to furnish Solid Indemnity to its patrons. It has but about one-third as much at risk in San Francisco, in proportion to assets, as the average of the other home companies, and its popularity is attested by the fact that it does the Largest Business on the Pacific Coast of any Company, American or Foreign.

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Life Scholarships, \$70.

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SPECIAL NOTICE

In Consequence of the Late Fire, we are Temporarily Located at the SYNAGOGUE Mason Street, between Post and Geary Streets, San Francisco.



TRINITY SCHOOL—CHURCH, BOARDING AND DAY School for Young Men and Boys, 1534 Mission St., San Francisco. Prepares for College and University. Easter Session opens Thursday, Jun. 4, 1884. Refers to—Wm. F. Babcock, Esq., Col. E. E. Kyre Joseph Powling, Esq., Gen. L. H. Allen, Wm. T. Coleman, Esq., Geo. W. Gibbs, Esq. For information, address, REV. E. B. SPALDING, Rector.



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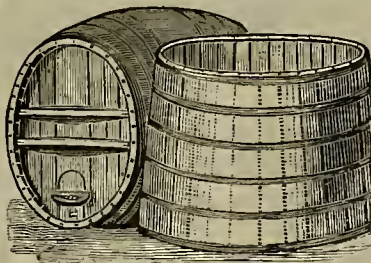
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Awarded 1st Premium for Engine Lathe, and Special 1st Premium for Portable For

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—AT—

Mechanics' Fair, 1883,

—FOR—

Automatic Cut-Off Engine. SILVER MEDAL AWARDED

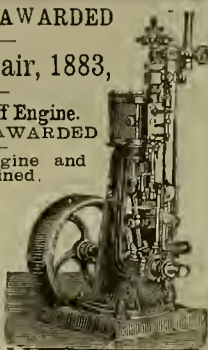
Best Hoisting Engine and Boiler Combined.

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Machine and

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—MANUFACTURERS OF—

CHAMPION METALLIC WHEELBARROWS.

First Premium, Mechanics' Fair, 1883.

We claim this Barrow to be superior to all others manufactured on this coast. For railroad, mining, grading and general contractor's use, they stand without an equal. We guarantee them to stand more hard usage than any other Barrow yet manufactured. We solicit Correspondence.

123 & 125 Beale St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882

STEIGER & KERR, Occidental Foundry,

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For Saving Gold.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

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MANUFACTURED UNDER ALFRED NOBLE'S Original and only valid Patents for NITRO-GLYCERINE. RING Powders, which has been and still is of such immense advantages to the Miner, Railroad Man and the Engineer. All other Nitro-Glycerine Compounds are simply imitations and adulterations of the Original Giant Powder. The Giant Powder Company manufacture three grades of Powder, which are the Safest and Strongest High Explosives in the market. The Original Nitro-Glycerine Compound, GIANT POWDER or DYNAMITE, is acknowledged by all the great chemists of the world as unapproached by any other compound. The Giant Powder Company have acquired the exclusive right to manufacture "NOBLE'S EXPLOSIVE GELATINE," which contains 96 per cent. of Nitro-Glycerine. It is still stronger than Dynamite, and even safer in handling. This explosive was used in constructing the Mont Cenis Tunnel. THE JUDSON POWDER is a black Powder owned and manufactured by the Giant Powder Company; it is from three to five times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it Breaks More Ground, Pulverizes Better, and Saves Time and Money. The only difficulty heretofore experienced by some consumers of this Powder has been that it required more time to get it to the bottom of a deep borehole. This has now been entirely overcome, and our JUDSON IMPROVED is now as dry as the ordinary Blasting Powder and runs as freely.

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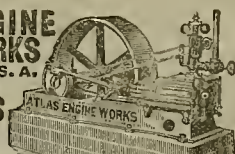
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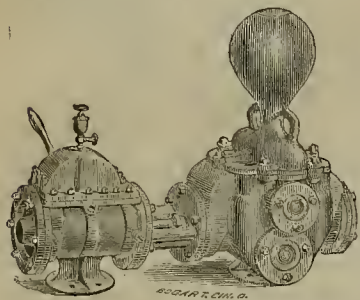
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The undersigned are in receipt of regular supplies from Cardiff, Wales, and offer the COKE
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HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS,

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Economy in space and fuel. Safety at high
pressures. Freedom from scaling. Equally
adapted for power and heating purposes.
Especially adapted for mills, factories, hotels,
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Will work well with muddy water and any kind
of fuel.

TESTIMONIALS.

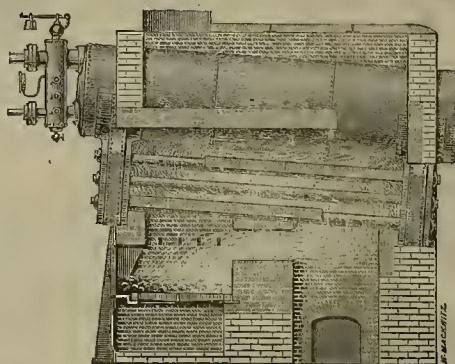
ST. LOUIS, Mo., Sept. 25, 1883

Messrs. Adolphus Meyer & Co. GENTLEMEN:
We cheerfully certify that the "Heine Patent
Safety Boiler" put up by you in our establish-
ment has proved very satisfactory in its working.
The chief points of excellence in the "Heine
Safety Boiler" are its economy in fuel and space,
freedom from scaling, aptitude for power and
heating purposes, working equally well with clear
and muddy water. We warmly recommend it to
all using steam machinery. Yours truly,

ANHEUSER BUSCH BREWING ASSN.

OFFICE OF Supt. of Royal Railways,
BERLIN, Sept. 23, 1883.

To Mr. H. Heine, Civil Engineer. In reply to
your inquiry of September 24, we respectfully in-
form you that the three boilers built under your
patents, under steam since September 25, 1881, at the Alex-
ander Platz Depot, as well as the two at Friedrich Strasse
Depot, under steam since September 22, 1882, have given
good satisfaction, requiring no repairs whatsoever to date.
The internal cleaning of the boiler was always accomplished



with ease on account of the convenient arrangement of the
tube caps, the adhesion of scales being fully prevented
thereby, and the boilers kept in prime condition.

(Signed): BRAUCKE.

Send for Circular and Prices.

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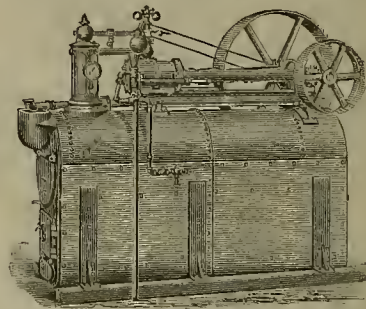
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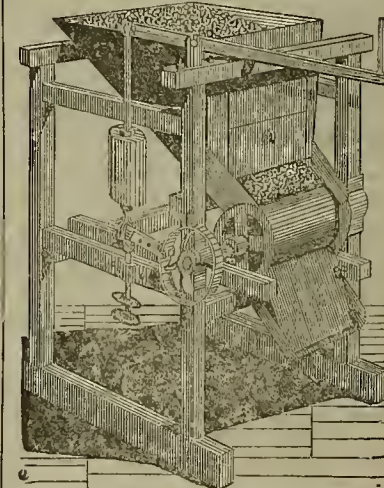
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This is the best and cheapest Ore Feeder now in use.
It has fewer parts, requires less power, is simpler in
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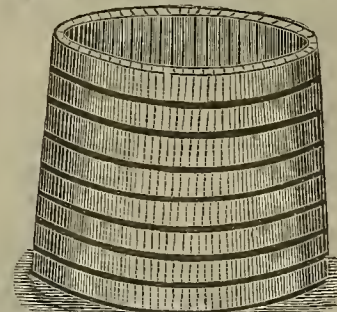
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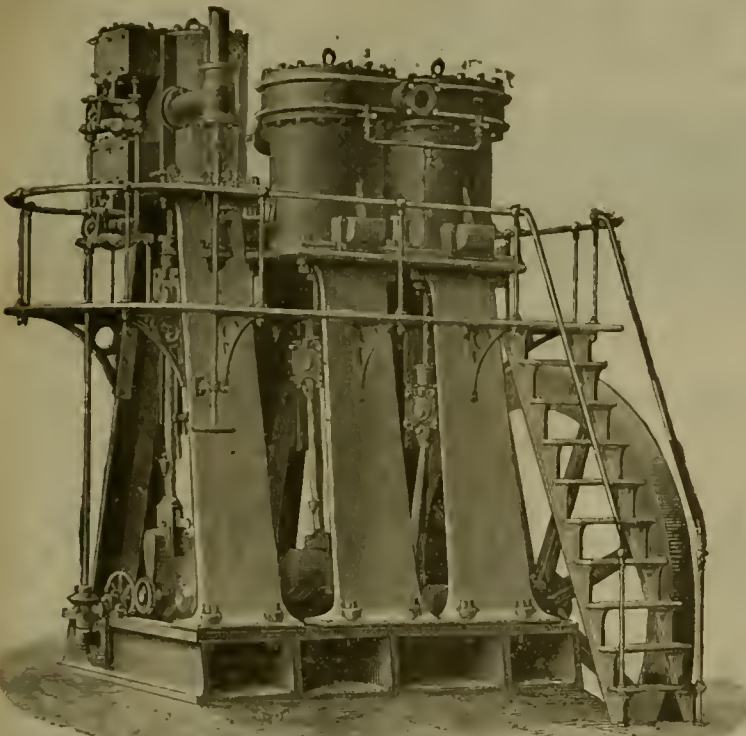
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SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

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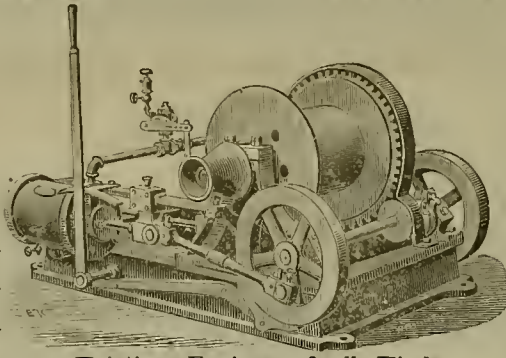
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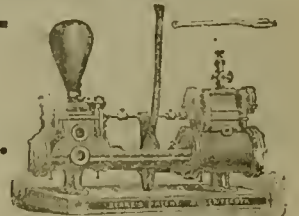
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(SUCCESSOR TO HAWKINS & CANTRELL.)

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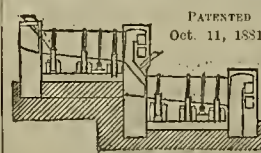
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Steam Engines and all Kinds of Mill and Mining Machinery.



PATENTED
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Patent Ore Roasting and Chloridizing
FURNACE.

Working up to 93 per cent. of Fire Assay, using 25 per cent. less salt since July, 1882. **LICENSES FOR USE FOR SALE,** or FURNACES CONSTRUCTED. Address **R. A. NEVIN, Patentee,**
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Of Every Description.

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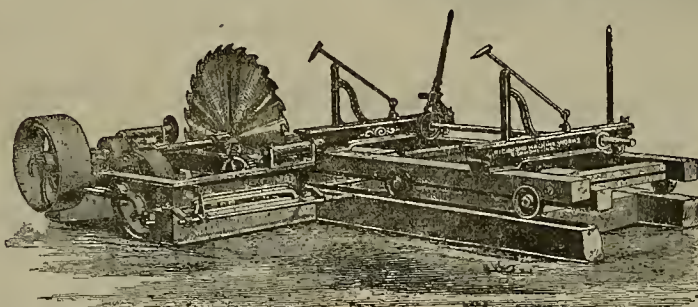
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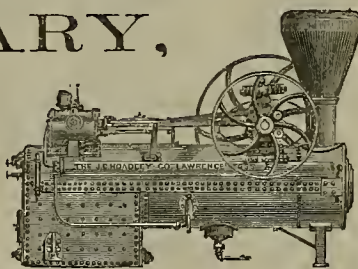
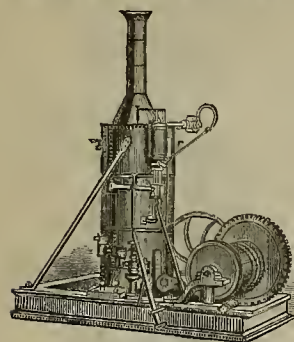
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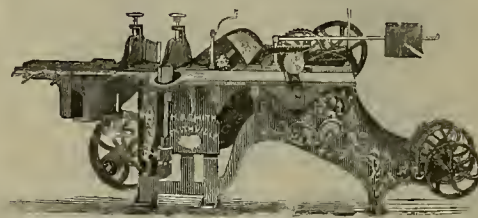
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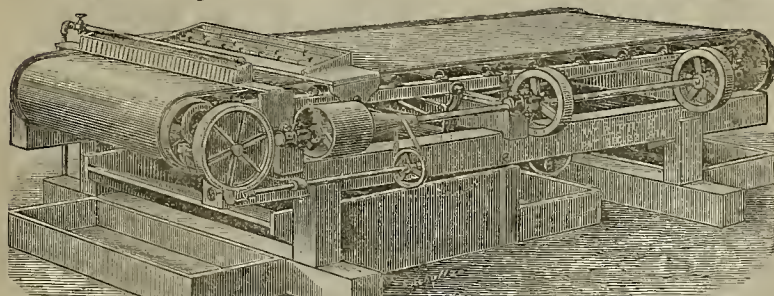
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That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

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on the needs of the progressive industrial classes of this coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is now and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That is this understood and appreciated is evidenced by the number of patents issued through their Scientific Patent Agency (S. P.) from week to week and year to year.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MARCH 8, 1884.

VOLUME XLVIII
Number 10.

Abandonment of Mining Claims.

Not long since some miners who made application to the U. S. Land Office for a patent on a certain mine had their application rejected because they did not "furnish positive and complete proof of the abandonment of a lode." It seems that the original location certificate, in giving the boundaries of their lode, said "the boundaries of this lode include a portion of the surface of an abandoned lode known as the Sampson." In answer to a request made to the Commissioner of the Land Office, by the miners, as to why he required this proof of abandonment, the Commissioner states that "it has long been the practice of this office, where entry of a mining claim is based upon a relocation of an alleged abandoned mineral claim, to require full, positive and complete proof in regard to abandonment of the prior location."

Section 2325 of the Revised Statutes prescribes the manner in which a patent may be obtained "for any land claimed and located for valuable deposits." After setting forth minutely the acts necessary to be done, the section closes with this language: "If no adverse claim shall have been filed with the Register and Receiver of the proper land office at the expiration of the sixty days of publication, it shall be assumed that the applicant is entitled to a patent, upon the payment to the proper officer of five dollars per acre, and that no adverse claim exists; and thereafter no objection from third parties to the issuance of a patent shall be heard, except it be shown that the applicant has failed to comply with the terms of this chapter." No adverse claim was filed in this case. The matter was appealed, and the Secretary of the Interior says there is no provision of the Statute which requires the proof called for by the land office. A claimant of the Sampson Lode could not be heard to require such proof, nor could any third parties object "to the issuance of a patent" without it. The question of abandonment would be a very proper one to try in the court under the provisions of section 2326, if an adverse claim was made.

The Secretary uses the following forcible language in his letter to the Commissioner of the land office, reversing the first decision: "The practice of your office in this respect seems to go beyond the law, and requires proof in a manner not contemplated by the statute. The claimant of the Sampson Lode, if there be any such claimant, had full opportunity to test the fact of abandonment, if he desired to do so, by filing an adverse claim for that part of the surface embraced in the boundaries of the Edith. If he failed to make the claim, I do not think it proper for your office to put the applicants for patent to the trouble and expense of proving an abandonment which they alleged in their notice of location, and which should be held to be admitted by failure to file an adverse claim; and especially should this be so under a statute which declares that if no adverse claim is filed "it shall be assumed * * * that no adverse claim exists."

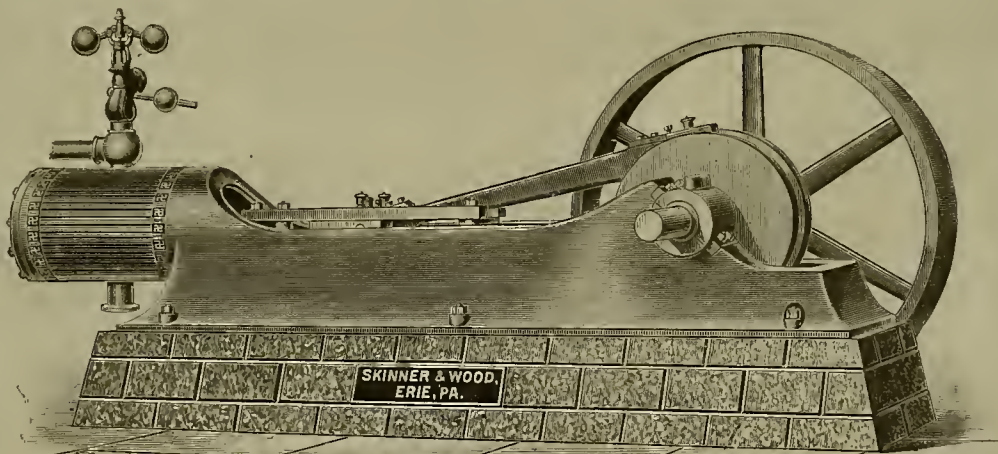
MONTREAL claims to have made about \$1,000,000 by her ice-carnival.

Mine Timbers.

No systematic attempts have been made in this country to prevent the rapid decay of mine timber by preservative or water-proofing material applied to the lumber before it is placed underground, but in England, Germany and France such experiments have been made with very satisfactory results.

The life of new timbers varies between extremely wide limits. In some of the mines of Continental Europe timber is still standing in a good state of preservation, apparently unchanged since it was placed in position one or two centuries ago, and in some of the anthracite mines of Pennsylvania timber thirty years old is still in a fair state of preservation, but this is the exception, not the rule. As a rule, the life of mine timber in anthracite regions is limited to a few years at least, and at some collieries the average life of timber has been estimated at less than one year.

Several causes contribute to hasten the decay



THE SKINNER & WOOD STATIONARY ENGINE.

of timber in anthracite collieries, prominent among which are warm, damp air, dripping water, running or standing acid water, the presence of air containing gases, and the changes from wet to dry condition of the mines following corresponding changes in the weather.

Academy of Science.

A regular meeting of the Academy was held on Monday evening last, President Davidson in the chair. Among the donations to the museum were samples of mud, dust and pumice which fell on the deck of the ship *Charles Ball*, which was within eleven miles of the volcanic island of Krakatoa at the time of its terrific eruption, last August. Mr. Ball presented some pieces of a hard substance, like rock which had been extracted from the jaw of a horse. Dr. Pebl read a paper on "Sexual Evolution in Botany." Mr. Robert E. C. Stearns spoke of the variations of molluscan forms, exhibited when extensive distribution is brought into consideration. The President read papers by C. B. Hill and Charles Buckwalter, describing a transit of the fourth satellite of Jupiter.

Mr. WHITE, agent of the Atchison, Topeka and Santa Fe railroad, states that the Mexican Central railroad will probably be opened by the 15th inst., and that there will then be a continuous line through to the City of Mexico.

An Improved Stationary Engine.

The accompanying engraving shows the Skinner & Wood stationary engine. It is complete, with automatic stop governor, pump and heater, and requires no lining up. The aim has been to make them easy to manage, strong and durable. It will be seen that they differ in principle from the ordinary type of engines or box-frame pattern, inasmuch as the frame supporting the working part of the engine is placed in a direct line with the center of the cylinder and crank shaft (known as the straight line principle), and is but another adaptation of the well known "Corliss" girder frame, which has been found to be the best form to successfully withstand the great force exerted on pistons of automatic engines; in using a center crank the makers are enabled to employ this principle to still greater advantage by making the frame double, and giving two bearings to resist the strain instead of putting it all on one, as in the case of the side crank engine. In this way they obtain

increased efficiency, and build an engine which is self-contained; really requiring no bed, though one is used merely to give a better foundation and to provide a receptacle for the drip. This frame is best adapted also to the requirements of strength.

The difference between the Skinner & Wood frame and the box frame in point of strength can be illustrated by the experiment of trying to pull a stick in two ends, or of breaking it over the knee; in other words, the metal is put where it will do the most good.

Center-crank engines have advantages over the side-connected engines, as they require less expensive foundations; can be placed in position and put in operation by anyone; while with the latter, the services of a skilled mechanic are needed to put the shaft in line and to keep it there, as the out-board pillow-block is placed on a separate foundation, and any setting or shifting will throw shaft out of line; again, with the style illustrated, no care need be taken to order "right or left hand engines," as the engine can be belted from either or both sides of the shaft as desired. These engines are in use at the elevators of Minnesota, Dakota, Iowa and Nebraska; in the cotton gins and small mills of Texas, and at planing mills, machine shops, printing offices, etc., throughout the United States. The Stearns Manufacturing Co., whose branch house on this coast is at 21 and 23 Main street, in this city, are

New Technical Society.

Several attempts have been made in this city to form a society of mining engineers, but they have been unsuccessful. It has been attempted also to maintain one composed of mechanical engineers, but this, too, failed. We have here scientific, microscopical and geographical societies, and a manufacturers' association for attending to the business wants of manufacturers, but there is no society such as exists in almost every large city for the interchange of ideas among engineers. That there is room for one here admits of no doubt, but so far, as has been stated, the scope of those proposed has been too limited to achieve success. One is now being formed which will embrace military, mechanical, mining, gas, electrical, sanitary engineers, architects, assayers, metallurgists, chemists and manufacturers.

The objects of this society will be the professional improvement of its members, the encouragement of social intercourse among men of practical science, the advancement of the technical profession in all its branches, and the establishment of a central point of reference and union for its members. Among the means to attain these ends shall be periodical meetings of the society, where questions concerning the entire profession will be discussed and acted upon. The special interests of the separate branches will be taken care of by a club, embracing only members of that particular branch, which club, however, will always remain a subordinate section of the general society. The proceedings will be published. It is believed that a society as above outlined will tend to give the members of the profession the standing they deserve. A committee is now drafting a constitution and by-

laws, which will be submitted to a general meeting for discussion and adoption, to be called as soon as the committee has finished its work. Time and place of such meeting will be duly announced. The call for the formation of the society has been signed by the following gentlemen: Geo. F. Allardt, C. E.; H. C. Behr, Mech. E.; Ross Browne, M. & C. E.; Aug. J. Bowie, Jr., M. E.; A. Craven, C. E.; R. Fennor, Mech. E.; San Francisco Gas-light Co.; J. Hagemaier, Mech. E.; A. D. Hodges, Jr., M. E.; Ch. F. Hoffman, M. & C. E.; J. E. Henkenins, C. E.; U. S. Surveyor-General's Office: Fr. H. Jensen, Chemist G. P. Co.; M. Manson, C. E., Chief Engineer Harbor Commission; George Parly, patent lawyer; W. Schroll, architect; Geo. J. Specht, C. E.; F. Von Leicht, C. E.; H. P. Vincent, C. E.; and L. E. Wyneken, architect.

The report of the officers of the Mechanics' Institute on the eighteenth industrial exhibition held in this city last fall has been issued. It contains the programme and review of the opening exercises, a list of premiums awarded and the reports of the various committees, besides other data interesting to exhibitors and others. The management states that a few of the diplomas are as yet uncalled for, and persons to whom they were awarded are requested to call at or send their address to the Institute Library on Post street.

CORRESPONDENCE.

We admit, unenclosed, opinions of correspondents. Eds.

White River Mines.

EDITORS PRESS:—The continuous and heavy downpour of rain for the past few weeks has greatly retarded mining operations in this camp, but nobody is grumbling, the rain being welcome to all.

The Bald Mountain Company is still pushing with two shifts the west level of its mine. From mouth of tunnel to vein is 1,600 feet. From end of tunnel to the end of west level at present is about 850 feet. Since cutting through the Doc. George chute, which this tunnel was specially intended to develop, this level has revealed only barren ground. This long, narrow, crooked level, skimming along under the grass roots, is very well calculated both to deplete its owners' pockets and to give the camp a black eye. If Messrs. Cook & Doyle care to succeed in this mining venture they will go back to the chute, cut through, and go down on it.

Mr. Spier, on the Old Grizzly mine, has suspended work, pending the expected arrival of his partner, who resides in San Francisco. He thinks he will shortly resume work, putting on two shifts.

It is understood here that some moneyed party is negotiating with Mr. Frank Cunningham for the purchase of some of his mines which are situated in the Slate range. As Mr. Cunningham is the owner of several large, well defined ledges, which prospect well, we hope he may induce capital to take hold of them—the more the better.

Mr. G. W. Brown, of San Francisco, has been here for the last two weeks trying to get the work of developing his mines started. Despite the inclemency of the weather he has a half dozen men employed, getting things in shape to put on a large force. Mr. Brown has purchased the Stancel and Redfield mines, and proposes to put down a shaft on the Redfield five or six hundred feet. The Redfield is a large vein of what we here call low grade ore—from \$12 to \$15 per ton—but increasing in size and richness as depth is attained. Mr. Brown intends to take it out by the roots.

Mr. D. B. James, acting in the interests of San Francisco parties, has for the past six or seven weeks had from six to ten men employed in re-opening the old Josephine mine, and in constructing a wagon road from the mines to the mill on the river. The Josephine is in a slate formation, which very much resembles that in which the Hite ledge occurs in Mariposa county, and although its workings have reached only the shallow depth of one hundred feet, the ore was so marvelously rich that it has produced nearly a quarter of a million dollars. Like many other good producing mines when worked in this camp, the Josephine has lain idle a long time, but now that its rest is broken it will be heard from again. I examined this mine to-day and found everything in good working shape. At the bottom of the main shaft the walls are filled with solid quartz, exactly five feet thick—a big ledge for this camp. From the bottom of the shaft a level has been started west and is now out thirty feet. From the shaft to the end of this level the ledge gradually decreases to about fifteen inches in width, but with indications of thickening again. The quartz in the big bulge will pay about \$15 per ton. At the end of the thirty foot level it will pay \$30 per ton—free gold. In addition to this free gold, the whole of this vast body of ore is a glittering mass of rich sulphurets. There is already enough on the dump, which, when milled will pay all the expense of reopening the mine to this State.

So my news items have related only to organized companies. There are many mines here owned by individuals, and worked in a small way with very good results, but as this communication is already sufficiently lengthy I must defer particular mention of them until another week.

H. J. KELLER.

White River, Tulare Co., Cal. Feb. 26th.

GOLD-SAVING MACHINE.—James H. Campbell, of San Francisco, and Joseph R. K. Irwin, of Portland, Oregon, arrived here Monday, bringing a machine with which they claim excellent results can be attained in saving the fine gold that ordinarily runs off into the streams with the tailings from quartz mines. They have set up the machine at the mill of the Merrifield mine, and are now engaged in demonstrating its efficiency.—*Nevada Transcript*.

AN ORE-REDUCING CONTRACT.—The Battle Mountain Messenger understands that a contract is about completed between the Dahlgren Mining Company, of Lewis, and D. P. Pierce, to reduce 200,000 tons of ore from the Dahlgren mine. Mr. Pierce, the Messenger says, has leased the Highland Chief 40-stamp mill to crush the ore, and will put it in running order by March 1st.

DUN GLEN.—G. McMillan, Superintendent of the Laug Syue mine, at Dun Glen, reports the mine and mill running steadily and producing bullion in paying quantities. It has been hard work to keep the mill going and the roads open during the recent bad weather.

Experiments on American Woods.

The following paper was read by Prof. S. P. Sharples, of Boston, Mass., before the American Institute of Mining Engineers:

Under the act providing for the taking of the tenth census, the Superintendent was authorized to appoint experts to inquire into special industries. Under this act Professor Charles Sargent was appointed to gather statistics in relation to the forest industries.

As chief of the Department of Forestry of the tenth census he has been busily engaged in this work since the fall of 1869. Soon after his appointment he became convinced that it would be desirable to make an examination of the fuel value of the various woods of the United States, and this work was placed in my hands.

At the same time I made the suggestion that while we had the opportunity it would be well to test also the strength of these woods. The suggestion was adopted, and Professor Sargent at once set his agents to work in various parts of the country to collect specimens of all the trees growing in their localities, employing, as a rule, botanists who were familiar with the flora of the region in which they were at work. The result of this work was the collection of over thirteen hundred specimens of wood, comprising over four hundred species and varieties, nearly one hundred of which had not before been described as trees existing in the United States.

The Ash and Specific Gravity

Of every specimen in this collection has been determined in most cases in duplicate. About 2,600 ash and 2,800 specific gravities having been determined, about 325 species were further tested for transverse strength and resistance to crushing. In this series about 1,800 specimens were tested. As each of these was tested in three different ways, it made in all about 3,900 tests. The specific gravity of each specimen in this last series was also determined, thus making in all about 10,600 tests that were made on the specimens. Many of these tests, however, included not only a single test, but often a series of tests that required at least ten entries on the final report, as I shall explain further in this paper.

In addition to the tests already spoken of, 70 tests were of the carbon and hydrogen in a number of specimens.

These tests have already, so far as the results of the ash and specific gravity of the dry wood is concerned, been published in *Forestry Bulletin* No. 22. The carbon and hydrogen determinations are to be found in *Bulletin* No. 18, while the tannin in the bark of a few of the most promising trees is found in *Bulletin* No. 24.

A *Bulletin* shortly to be published is to give the deflections under various loads of the woods tested in this manner, and the weight under which they failed, together with the force necessary to crush in the direction of the fiber pieces, whose length was equal to eight diameters. In addition to the tables published in the *Bulletins*, the final report will give the force necessary to indent the wood.

This series of tests is felt to be incomplete in many ways, and with the experience that has been gained in the work could doubtless be improved. A brief description of the methods used may be of interest.

Each specimen as soon as received was given a number, and this number has been constantly repeated in all the work done on that specimen; it is designated in the reports as the office number, and wherever met with always refers to the same tree.

After numbering, the sticks were at once sawed into bars five centimeters square. These pieces were then seasoned by air-drying. During the first winter they were kept in a room warmed by a stove to about 70° F. After that they were removed to a timber loft at Watertown Arsenal, where they were kept until they were dressed for the final tests.

Two Blocks of Fifteen Centimeters

In length were taken from each specimen and dried rapidly with steam heat until they had lost most of their moisture. From these pieces, blocks of exactly 11 centimeters in length and about 35 millimeters square were dressed out. These were then placed in an oven which was maintained at a constant temperature of 100 until the blocks were perfectly dry. After they had ceased to lose weight, they were carefully measured with a micrometer caliper and then weighed. From the measurement and weight it was easy to calculate the specific gravity.

The ends removed from these blocks were used for determining the ash. They weighed from 10 to 20 grams and thus gave quite appreciable amounts of ashes. The ash was determined by drying the wood in the same manner as the specific gravity blocks, then carefully burning in a platinum dish in a muffle-furnace heated by gas. The heat was so regulated as to burn the ash perfectly white without melting it. In most cases the ash was left in the exact shape that it occupied in the wood. It was judged best to report the ash exactly as found, and not to attempt to make any correction, on account of carbon dioxide that might have been lost from the calcic carbonate present. From these results, the

Approximate Fuel-Value

Was calculated, assuming that equal weights of

all woods have the same fuel-value. This value is supposed to be given more correctly by taking as the weight of the wood, not the specific gravity, but the weight of a cubic decimeter, minus the ash contained in it. The ash evidently adds nothing to the fuel-value, while it does add to the weight. This assumption, which is the one which is generally made, is not strictly true, but it is near enough for all practical purposes. It is founded on experiments made by Count Rumford and Marcus Bull.

The carbon and hydrogen determinations were made by burning fine sawdust in a platinum boat in a current of oxygen and collecting the products in the usual way. These analyses were calculated on the dry wood. The determinations may be conveniently divided into two classes—those of the coniferous woods and the non-coniferous.

The Coniferous Woods

Examined, with two exceptions, gave larger amounts of carbon than the hard woods. These two exceptions were the common white cedar or *arbor vitæ* of the north, and the black spruce or *pecca alba*, neither of which would be selected as valuable fuel. The average composition of twenty-nine specimens of coniferous woods examined was: Carbon 53.21; hydrogen, 6.45; ash, .32; specific gravity, .5624. Fuel-value by weight, 4488.3; by volume, 2524.2.

For the non-coniferous woods the average results were: Carbon 49.53; hydrogen, 6.33; ash, .66; specific gravity, .6951. Fuel values by weight, 3993.9; by volume, 2776.1. These latter values agree very closely with those given in the books, as the results of the analyses of European woods. It is rather singular that with the exception of fir, no coniferous woods have been reported on in Europe.

Forty-one determinations of non-coniferous woods were made. After the long sticks of wood have become thoroughly seasoned, they were dressed out to the exact size of four centimeters square, and were sawed as near as possible to the length of 11 decimeters. They were then tested on the Watertown machine. In testing, the stick was placed in a perpendicular position resting on supports that were exactly one meter apart. The force was then applied at the center of the length by means of an iron bearing, which had a length a little greater than the width of the stick and a radius of 12.5 millimeters. The weights were slowly applied, 50 kilograms at a time, after each weight was added, the weights were removed and the set read; the weights were again applied, the reading again taken at 200 kilograms, and then at every 50 kilograms until the stick was broken, the breaking weight being noted. In making the report, the coefficient of elasticity for the weights, 50 and 100 have been calculated; also the modulus of rupture.

So far I can only give the most general results in regard to these tests. In the first place we have not been able to establish any general law in regard to the direction in which a stick is the strongest, that is, parallel or perpendicular to the annual rings.

The Results Have Shown,

However, that it is by no means necessary to break two sticks to show which is the strongest, provided they are of the same kind of wood. The weak stick will show the largest deflections from the start. The strongest stick found was a specimen of locust, but following closely after it were specimens of hickory and Southern pine. Ash was found to stand well up to a certain point, and then it gave way suddenly and without warning, generally shattering badly. The California redwood was another that shattered very much. White oak was found to be inferior in strength to several other oaks and to Southern pine, the average breaking weight of 40 specimens being 386 kilograms, while the average breaking weight of 8 specimens of *quercus prinoides* or the cow oak of the South was 528 kilograms.

The average of 27 specimens of *pinus australis* was 490 kilograms. The average of 36 specimens of the Douglas fir from the Pacific coast was 374 kilograms, and of 6 specimens of the Western larch was 323 kilograms.

Thirteen specimens of white pine (*pinus strobus*) gave 274 kilograms.

Eleven specimens of beech gave an average of 454 kilograms.

Sixteen specimens of *carya sulcata* averaged 464 kilograms.

Twenty specimens of *carya alba* averaged 512 kilograms.

Twenty-four specimens of white ash averaged 378 kilograms.

Eight specimens of locust averaged 543 kilograms.

The next series of tests which were made consisted in taking specimens of the same size, square as before, and 32 centimeters long, and compressing them in the direction of their fibers. Here again both locust and Southern pine stood up well.

Nine specimens of locust stood an average weight of 11,206 kilograms.

Five specimens of Western larch stood an average of 10,660 kilograms.

Thirty-five specimens of white oak stood an average of 8,183 kilograms.

Twenty-four specimens of *pinus australis* stood an average of 10,498 kilograms. The third series of tests was to find the force necessary to

Indent the Wood

At right angles to the grain. These tests are not finished yet, and I have made no examina-

tion of the results. They are made on blocks four centimeters square and sixteen centimeters long, the bearing of such a size that it makes an impression on the block which extends from side to side of the block and is of the same length; or, in other words, is four centimeters square.

In closing this paper I wish to express my thanks to Col. Laidley for valuable suggestions made during the progress of the work, and to Mr. Howard for the able manner in which he has executed the tests. These tests have been made at the joint expense of the War Department and the Census Bureau, the machine having been put at our service by order of the Secretary of War.

The tests will all probably be published in the annual report of the testing machine, calculated in feet and pounds.

The Mount Cory Mine and Mill.

Two years ago the Mount Cory Mining District was scarcely heard of outside of Esmeralda county. It contained a number of good claims, but no mines developed sufficient to attract much attention. The prospectors knew it was a good camp, but had no means with which to prove their assertions, and, owing to the refractory character of the ore, they could not then realize anything from the proceeds of their claims. It was, in fact, what many other camps are now—a rich but unimproved district, awaiting the coming of men who had money to invest and faith and energy to pursue their plans to a successful completion. The Walker Lake *Bulletin* has a very extended description of the Mount Cory mine, from which we take the following:

The mine, situated at the head of Big Squaw canyon, is in a granite belt, through which a well defined porphyry dyke extends, varying in width from 80 to 260 feet. The ore bodies at present being worked are found in this porphyry, the veins, two in number, being from 18 inches to 10 feet wide. The rich ore bodies in these veins extend on some of the levels for a distance of 260 feet.

Notwithstanding the difficulties encountered in overcoming natural obstacles in one of the most rugged mountain ranges in the State, the development proceeded rapidly, and now the mine is worked at a depth of 560 feet, and has five levels, opened at intervals of about 100 feet. There are about 5,560 feet of drifts and crosscuts and 1,015 feet of winzes. From tunnel "E," the lowest tunnel, a large two-compartment winze is being sunk which is down about 100 feet. This winze is distant from the vein about 50 feet, and crosscuts will be run from it at every 100 feet of depth. In tunnel "E" there are three distinct and large ore bodies, and there is every reason to believe that they extend to a great depth under the present workings.

The company, in order to facilitate its operations and to prevent future embarrassments in carrying out its plans, purchased the Nichols ranch, at the mouth of the canyon, with all the water rights, and this was fixed upon as the site of the immense mill, which has just been finished. The owners of the mine also purchased and perfected the title to 4,000 acres of timber land. This gives them an ample supply of fuel and timber for many years, both for mine and mill.

One of the greatest difficulties encountered by Mr. McKenzie in the early stages of his work was the obtaining of supplies at the mine, and in the fall of 1882 he began the construction of a wagon road from the mouth of the canyon. This road, laid out through one of the roughest gorges in the mountains, was an arduous undertaking, but engineering skill and generous outlay of money has made an easy grade and good roadway for business and travel.

In February, 1883, when the road was nearly finished, the wonderful wealth of the mine had become an established fact and the town of Coryville was laid out on the line of the road and about half a mile below the town. This town now contains numerous dwellings and business houses, and a certainty of a brisk and prosperous era is entertained by the residents.

The operations of Mr. McKenzie having shown great quantities of rich but refractory ore, it was thought advisable to erect works by which the reduction could be performed near the mine and the cost of transportation saved.

W. I. Salkeld and W. R. Eckart, the contractors for the construction, ably assisted by their foreman, J. W. Cline, have, by the perfect manner in which they have completed their work, considerably added to their reputation as successful engineers. The mill, now finished and in complete operation, is under the management of Mr. A. Arents, one of the best known workers of precious metals on the coast.

The outlay to the present time has been over \$400,000, of which by far the greater part has been spent in Esmeralda county in labor and improvements. This, with the certainty of future production, will soon require the employment of many men, and gives a solidity to the character of the business outlook of this section which is gratifying to those who have located here with the intention of remaining.

There are now forty-five men employed at the mill and seventy at the mine. In addition to this, other mines are being actively prospected, as the successful working of the Mount Cory ore puts an immediate and definite value on their output.

MECHANICAL PROGRESS.

Heating and Hardening of Steel.

To understand how to properly harden and temper steel tools and other articles, is fully as necessary to the machinist now, when most small tools are kept in stock by dealers, as it was twenty years ago when each shop made its own tools. Lathe and planer cutters, cold chisels, milling cutters, and several other tools and appliances are liable to breakage, and must be redressed at the anvil, refinished, and rehardened and tempered. But many of these tools are ruined in this attempt, and this destruction usually comes in the hardening.

Some mechanics attach much importance to a hardening pickle, but probably failure comes as often by hardening and tempering. An evenly distributed heat of the proper temperature is absolutely requisite to success, and this is not always possible to assure by heating in an open fire. One portion of the article is liable to be overheated; judging of the amount of heat by color, is not always to be trusted; a dark corner or a cloudy day changes the conditions from a light shop and a sunny day sufficiently to make a great and telling difference in the amount of heat induced by sight.

A perfectly reliable method of heating and hardening is by means of the lead bath. It is an easy matter to keep in the shop a crucible or hot iron pot of lead to be used as occasion demands. The article to be heated for hardening will not suffer when in the lead bath, even if not closely watched, as is necessary at the open fire; the melted lead cannot pass to a degree of heat injurious to the steel. But one condition must be strictly observed—the lead must be pure and clean; it is best to buy the mercantile pig for this purpose. A manufacturer of pipe threading and pipe-cutting tools in New England city, desiring to abandon his old-time open fire for the lead bath, melted a lot of old lead pipe, partially corroded, and mixed with it a quantity of type metal. His hardening was a failure until he used pure lead.

In order to harden well, it is necessary to heat the article through and through. If the piece is of unusual thickness, as a tap or reamer of three inches or more in diameter, it is better to drill a hole through it from end to end, so that the heating can be even and the hardening equal. A tap of four inches diameter broke squarely across in the hardening. It was of solid steel. The drill of an inch hole from end to end was practiced, and a large number of the same size taps were hardened without a failure. The surfaces of the fracture of the broken tap showed plainly the evidences of unequal heating and uneven cooling.—*Manufacturer and Builder.*

Massive Machinery.

An interesting description is given, by a correspondent of the *New York Times*, of a mammoth wheel made by the Dickson Manufacturing Company, of Scranton, Penn., for use in the copper mines of the Calumet and Hecla Mining Company, on the borders of Lake Michigan. It is the second wheel of the kind made at the same establishment. The weight of the wheel is 62 tons, and its cost in place will not be less than \$25,000. The titanic wheel, says the correspondent, is a marvel of mechanical ingenuity, strength and skill. The spur-gear in the center is 43 feet in diameter at the pitch line, 42-inch pitch, 12 inch face, the teeth of which have all been milled or cut cycloid, and are mathematically correct. There are 352 of these teeth on each wheel, and its circumference at the pitch-line is 135 feet. On each side of the spur-gear there are 25 double elevating buckets or pockets inverted, making in all 100 buckets, which are stationary on the inside of the periphery of the wheel, and are capable of scooping up at a single revolution nearly 2,000 gallons. The wheel will make four revolutions per minute, lifting 8,000 gallons in that space of time, or 480,000 gallons an hour. The office of this wonderful wheel is to remove the refuse from the copper ore. It will be set in solid masonry, with arches through which the launders used for washing the ore will pour their contents, to be taken up by the buckets already referred to and deposited in outlet launders placed at an elevation of 40 feet, which will afford a sufficient impetus to carry the waste into Lake Michigan.

The enormous amount of refuse now made at this mine covers an acre of ground 1 foot thick every 48 hours. This is a great drawback, and entails heavy cost on the company. The shaft upon which the wheel revolves is 30 inches in diameter, and is made of gun iron. It rests in ponderous pillow blocks having universal bearing. The centers of the wheel are octagonal, and its mighty arms are made of wrought-iron lattice-work. They are pyramidal in shape, and jutting out from a common center present an imposing appearance even in repose. The ends of the arms, which are called the bucket segments, are of cast iron, and the spur segments and buckets are bolted to them. The entire affair is put together with turned bolts driven in reamed holes.

THE ELECTRO-MOTOR.—It may certainly be said that for pumping, sawing, and such like operations of a large country house, an electro-

motor, actuated by the dynamo which lit the house at night, would be cheaper and quite as effective as a steam engine. Sir William Armstrong, at his house near Newcastle, has utilized a waterfall in his grounds to light his house by night and to supply it with power by day. The waterfall is 1,500 yards from the house. It actuates a turbine, which it connects by a belt to a dynamo electric converter, capable of transmitting about five horse power into a current of electricity. The current is conveyed by a suitable conductor to the house where it works forty Swan lamps. In daylight it works a saw-mill. Sir William Semans, at his country seat, near Tunbridge Wells, uses a steam engine, the waste steam of which warms the hot-houses. During the night the primary machines actuate two powerful electric lights, which are employed in forcing the growth of various fruits and plants which live, as it were, in perpetual sunlight—or its equivalent. During daylight one of the machines is used to work a chaff cutter and the other machine at the farm a quarter of a mile away; the other does the pumping of the establishment. At night, of course, they are employed for light.—*Nineteenth Century.*

MACHINERY PROGRESSIVE.—Some manufacturers, says the *Mechanical World*, in fact probably the majority of them, when once they have put down machinery for a given class of operations, consider that they have done everything that is needed, never dreaming that tools and machinery can be, and are constantly being, improved. They are horrified if they are told that it would pay them to pull out a given machine; they appear to have a pride never to have a new machine. The various machines work away from year to year—the smiths' forges, the shafting which was put down at the starting of the works—there they remain, doing good work, perhaps, but not the best work, not the quickest and cheapest work, and therefore the works become old-fashioned; the workmen fall into ruts and become old-fashioned as well as the machinery. A machine should never be allowed to become worn out; it should be replaced by an improved one long before that period arrives.

A NEW ELECTRIC ENGINE.—A small electric engine has lately been on exhibition in New York, having a piston movement, and claimed by the inventor to be the first of that kind which has been manufactured in this country. The engine is supplied from a battery and consists of four electro-magnets, two on each side, with armatures of permanent magnets. While one attracts, another repels, giving the piston movement of the common steam locomotive, and the little engine is similar to this in the remainder of its mechanism. This engine of two horse power, the inventor says, will revolve from 600 to 1,000 times per minute. It cost \$150, and the electricity of a storage battery to run it a day of 12 hours will cost, he estimates, 50 cents. It takes up little space, and can easily be placed under a car. Its inventor also hopes to adapt it to road carriages, and believes that cabs can be run by it for 50 cents a day.

THE USE OF ALUMINUM PROCESS for the decoration of iron and steel, as well as for their protection against rust, is spoken of in the German technical press. The process is intended to take the place of nickeling, tinning and coppering. The coating of aluminum is said to leave the sharpness of outline unimpaired, and to adhere very closely, being applicable to both cast and wrought work. Decoration with gold, silver or vitrifiable pigments is said to be facilitated by this method. It is considered that the high price of aluminum—caused by the expensive processes by which it is made—will not seriously affect the success of this process.

THE USE OF LIGNITE.—In the course of a discussion on artificial fuel before the Hanover branch of the German Society of Engineers, it was stated that experiments made by Herr E. Fisher with lignite containing 60 per cent of water and having a calorific value, when coming from a mine, of from 1,000 to 1,500, have when dry from 3,000 to 3,500. The best temperature for lignite seems to be 450° Celsius, when the aid of steam is introduced. In this way 32 per cent of the weight of the moist lignite is obtained in the form of coke, holding from 6 to 7 per cent of ash and having a calorific value of 7,500, equal to a fair quantity of bituminous coal.

IRON RAILS BECOMING OBSOLETE.—The production of iron rails seems to have ceased substantially, at least in England and this country, and 1883, apparently, is likely to be very near the date of their disappearance. In that year only 25,000 tons of iron rails were exported from Great Britain, out of a total of 770,000, the total being within 8,000 tons of the great quantity annually exported from this country for twelve years or more. In 1878, when the total British rail exports were but 358,750 tons, 30 per cent of the whole were iron rails; last year only 31 per cent of the whole were of iron.

POLISHING VENEER WOOD.—After scraping up veneer, first give a coat of size for stopping up grain, then color or stain, and proceed to polish. It is a great mistake to use too much oil. For all hard woods the polishing is the same, but not for stopping, as size is generally used for dark wood and plaster or chrome for light. Putty-line is a good stain for Honduras mahogany, chestnut and other woods.

SCIENTIFIC PROGRESS.

How Smoke is Formed.

Hundreds of articles have been written, and have been printed in newspapers, and many valuable lectures have been given, on the important subject of smoke and its destructive properties, but I have never met with a clear explanation as to how smoke is formed or what is the cause of smoke forming. In the most important book of the Smoke Abatement Exhibition even, where the highest talent of the day kindly gave valuable time to the subject, not a sentence is given as to how or in what way smoke is formed. I may almost go further, and say that it appears as if learned men do not agree, or have not made up their minds, if in certain cases smoke is formed, or if the smoke so formed is afterwards consumed. I have a circular before me where the test of a boiler is given by a high authority, which states: "The boiler either does not produce or it consumes its own smoke." This will show that there is not yet a clear explanation before the public as to how smoke is formed, and I maintain that cause and effect ought to be properly understood before the necessary care in preventing it can be taken; therefore, a clear and most simple case may be here stated.

It is well known to every one that when fresh coals are placed on a fire in an open fire-grate, smoke arises immediately, and the cause of this smoke is not very far to seek, as it will be easily understood that before the fresh coals were put upon the fire within the grate, the glowing coals radiated their heat and warmed the air above, and thereby enabled the rising gases at once to combine with the warmed air to produce combustion, but when the fresh coals are placed upon the fire the coals absorb the heat and the air above remains cold.

By gases I mean the gases arising from coals whilst on or near a fire; and it may not be known to every one that we do not burn coals, oils, tallow or wood, but only the gases arising therefrom. I can make this clear by the lighting of a candle, which will afford all the information required. By lighting the candle fire is set to the wick, which by its warmth melts a small quantity of the tallow below, and this melted tallow is directly absorbed by the capillary tubes of the wick, and thereby so very finely and thinly distributed that the burning wick has heat enough to be absorbed by the small quantity of dissolved tallow to form the same into gases, and these gases burning, combined with the oxygen in the atmosphere, gives the light of the candle. A similar process is going on in all other materials, but coal contains already about 17 per cent in weight of gases, which liberate themselves as soon as they get a little warm. The smaller the coal the more rapidly will the gases be liberated, so that in many cases only part of the gases are consumed.

To return to the subject, this fact is that the volatile rising gases from the coal cannot combine with the cold air for combustion, still a combination does take place in the following way: The cold air, in the act of combination, absorbs a part of the warmth of the rising gases, which they cannot spare, and therefore must condense, so much so that small particles are formed, which aggregate and are called smoke, and, when collected, produce soot; but so long as these particles and gases are floating they cannot burn or produce combustion, as they are surrounded by a thin film of carbonic acid. It is only when collected and the acid is driven off that they burn rapidly.

I have now shown that cold air is the cause of smoke, which may be greatly reduced by care. In the open fire-grate the existing fire ought to be drawn to the front of the grate, and the fresh coal placed behind or on the back of the fire. The fire in the front will then burn more rapidly, warm the air above, and so prepare the rising gases for combustion. In this way smoke is diminished, as the gases from the coals at the back rise much more slowly than when placed upon the fire and the air partly warmed. The same process may be applied to kitcheners, thereby almost entirely preventing smoke after the first lighting. For stoves and boilers, warm air may be produced for the entire combustion of all gases.—*Cor. London Iron.*

An Interesting Experiment.

The experiment here described, though containing nothing new to those familiar with the principles of acoustics, may be of some interest to a class of our readers who are students of this science, especially as it is something not occurring on such a scale in even the most noted laboratories of the country. We copy from a correspondent of the *Scientific American*:

In illustrating the longitudinal vibrations of rods and tubes, I held firmly in one hand, at about the middle, a large glass tube, and rubbed it back and forth with a wet woollen cloth held in the other hand. The sound produced was quite loud and piercing, and was of itself sufficient to excite the interest of a large class seated before me. So energetic, indeed, was the vibratory motion that I felt rather apprehensive for the safety of the tube. Suddenly a crash came, just below the hand that held it, and the tube for a length of nearly three feet was shivered to many pieces. The fragments were, I suppose, of a mean length of two inches,

and the tendency was to break into rings somewhat approaching the wave-length of the vibrations constituting the sound emitted.

The tube was about 6 feet long, about 2 inches in diameter, and the glass more than an eighth of an inch thick. It will be seen from these dimensions that it was quite a stout pipe, and the effort to break it with the hands, even across some point as a fulcrum, as the knee, would have involved the exertion of a great deal of strength. Yet there was very little muscular strength exerted, and that not directly against the strength of the material. Moreover, the shattering occurred in the half below the hand, and was not of the part rubbed by the cloth.

SOMETHING ABOUT FOG.—The vapor in the atmosphere is nearly or quite transparent, but when, from any cause, the air becomes cooled below the dew point, a portion of its vapor is precipitated in the form of drops of water extremely minute, which affects the transparency of the air and forms fog or cloud, according as it occurs near the surface of the earth or in the upper regions of the atmosphere. When steam rises from a vessel of warm water and mingles with a cold atmosphere, a portion of the vapor is condensed and a mist is formed. This mist is sometimes, but improperly, called vapor. Vapor of water is a gaseous body, while mist is a liquid body. A similar condensation often takes place in nature upon a large scale, and the mist is then called fog. Fogs are most prevalent near the banks of Newfoundland. These fogs occur in every month of the year, but they are most frequent in summer, when the banks are enveloped in fog nearly half the time. The vapor which causes these fogs is furnished by the warm air of the Gulf Stream, which is condensed by the cold air of the banks, the contrast of temperature being here more sudden than is found in any other part of the Atlantic ocean. During July the water on the banks frequently has a temperature of 45 degrees, while within a distance of less than 300 miles the Gulf Stream has a temperature of 78 degrees. The contrast in temperature is almost equally great in January, but fogs are less frequent in winter, because at that period the air is more agitated by storms, which tend to equalize the temperature over different parts of the ocean.

ELECTRIC LIGHT AND NOXIOUS INSECTS.—A European journal relates that a few months since workmen employed upon some constructions on the bank of the river Dnieper, in Central Russia, employed the electric light to enable them to prosecute their labors at night. The brilliant rays of light attracted so many millions of nocturnal moths, beetles and other insects that from time to time it was necessary to stop work and set all hands to destroying the clouds of winged victims that frequently completely obscured the light. This suggested the idea of employing the electric light to destroy nocturnal insects prejudicial to agriculture, and experiments in that direction are to be tried next spring. Not only to insects, but to fish, the light proved fatally attractive. Its rays, directed to the surface of the water, drew together vast quantities of all the fishes found in the Dnieper, and when within the charmed field of illumination they lay crowded together in masses, seemingly blinded and stupefied. The workmen, improving the opportunity, made a notable haul of fish.

CIRCULATION OF SOLAR ENERGY.—M. Duponchel calls attention to a work, printed in January, 1882, in which he stated that the actual facts of science in regard to the nature of light, heat, electricity and magnetism testify to the absolute conservation of the living force which is manifest under divers forms of motion. Many years ago he tried to explain how the compensations could be effected, which are necessary to maintain the energy, and how the heat which is emitted can return to the focus of departure, forming a closed current and a continuous circulation analogous to that which results from the action of the heart upon the movements of the blood. The views which have lately been published by Siemens have induced him to undertake a mathematical discussion of the question and to confirm the results of his theory by facts of observation.—*Rev. Scientific.*

PHOSPHOR-MANGANESE TIN AND COPPER.—An English firm says they have, after a long series of experiments, succeeded in alloying manganese with phosphorus and tin and copper, producing a metal which, for tensile and strength and durability, they think will be superior to any alloy in the market. The phosphor-manganese tin may be used in the same manner and in similar proportions as phosphor tin, though it is better to cast at a little higher temperature, but the result will be found much superior, both as regards hardness and tensile strength.

CONTENTS OF FRESH FALLEN SNOW.—The *Popular Science News* says that a Swiss scientist named Floegel, found in the freshly fallen snow living infusoria and algae, bacilli and micrococci, mites, diatoms, spores of fungi (in immense numbers), also fibers of wood, mouse hairs, pieces of butterfly wings, skin of the larva of insects, cotton fibers, pieces of grass, epidermis, pollen grains, rye and potato flour, grains of quartz, minute pieces of roofing tiles, with bits of iron and coal. Poets must hunt up some other emblem of purity.

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SAN FRANCISCO:

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Passing Events.

The phenomenal rainfall in the Southern part of this State is attracting great attention. The overflow of streams, washing away of bridges and stoppage of railroad travel is something very unusual in that region. In the central and northern portions of California much rain and snow have fallen. There will be plenty of water this spring, and a prosperous year is assured.

The topic of the hour is the Governor's proclamation calling an extra session of the Legislature. We publish the call in another column. The Coeur d'Alene excitement still continues unabated, and many miners are preparing to leave for the new region as soon as the weather warrants.

ABRAHAM LINCOLN's tomb at Springfield, Ill., is going to ruin. Two of the supporting arches have collapsed, one corner of the monument has settled several inches, and it is estimated that the restoration will cost \$4,000.

A SNOW-SHOER says he saw over 500 dead jack rabbits while crossing from California to Reno. They had starved and frozen to death, and were but a few feet away from their burrows.

SEVERAL rich pocket mining strikes have been made in Tuolumne county during the past six weeks.

Classes of Coals.

The commercial distinction between anthracite, semi-anthracite, semi-bituminous and bituminous coals is largely governed by the geographical location of the mines from which the coal is obtained. These arbitrary commercial distinctions are difficult to break down, even if it were worth while. The following rough generalization may be useful, but its utility is limited by the fact that the coals of each class, as known to the trade, overlap into those above and below it:

In coals known as anthracite the volatile matter is usually less than 7 per cent; semi-anthracite, volatile matter usually less than 10 per cent; semi-bituminous, volatile matter less than 18 per cent; and bituminous, volatile matter less than 18 per cent. The different varieties of semi-bituminous and bituminous coals are thus grouped and described by Professor Rogers.

Semi-bituminous includes semi-bituminous cherry coal and semi-bituminous splint coal. Bituminous includes coking coal, cherry coal and splint coal.

Anthracite coal is characterized by its small percentage of volatile matter, high specific gravity, hardness, nearly metallic luster, rich black color and semi-conchoidal fracture. It ignites with difficulty, produces an intensely hot fire, giving off no smoke, and burns with a very small blue flame of carbonic oxide (produced by incomplete combustion), which disappears after the coal is thoroughly ignited.

Semi-anthracite coal is neither as hard nor as dense as anthracite, its luster not so brilliant; its percentage of volatile matter is greater, and the cleavage planes or "cleats" are much closer the fracture, often approaching the cuboidal. This coal when once ignited burns at first with a flame somewhat resembling that of bituminous coals, but this shortly ceases, and the anthracitic character of the coal becomes at once apparent.

Cherry coal is a deep black, dull or lustrous coal, with a conchoidal fracture, readily breaking up into cuboidal fragments. It ignites easily, making a hot, quick fire with a yellowish flame, and retains its shape until thoroughly consumed. Its specific gravity is much less than anthracite, about 1.30.

Splint coal is of nearly the same specific gravity as cherry coal, which it somewhat resembles. It has a slaty longitudinal and a very uncertain cross-fracture. It is not very easily kindled, and makes a slow, dull fire.

Cherry and splint coal, of both the bituminous and semi-bituminous varieties, usually leave a rather large percentage of ashes.

Cannel coal is remarkable for its dull slaty or resinous luster, its conchoidal or slaty fracture, and its large percentage of volatile hydro-carbon. It burns with a long flame, giving off a large amount of smoke, and usually leaves a very large percentage of ashes.

Caking or coking coal, the most important of the bituminous coals, is readily known by its behavior in the fire. It burns with a long yellow flame, giving off more or less smoke, and creates an intense heat when properly attended. It is usually quite soft, and does not bear handling well. In the fire it melts, fuses, and finally runs together in large masses, which are rendered more or less porous by the evolution of the contained gaseous hydro-carbons. The cleat or cleavage joints (butt and face) usually run nearly at right angles, giving the coal a cubical fracture.

Coals of the hard, dry anthracite class burn without smoke or colored flame (but with a faint blue flame until thoroughly kindled); they have a small, almost colorless and intensely hot flame when thoroughly ignited, but ignition is always slow and difficult.

CALIFORNIA MINING LIFE.—There has just been issued by Dewey & Co., publishers of the MINING AND SCIENTIFIC PRESS, a little pamphlet by Dr. Henry DeGroot, entitled "Recollections of California Mining Life." It treats of the primitive placer mines and discovery of gold; the pioneers of the pioneers—their fortune and their fate. Many early legends are given. There is a short sketch of General Sutter and one of James Marshall. There are several characteristic engravings made from drawings by artists here in early days. The little pamphlet is sold for 25 cents, and will interest many old Californians and those who like to hear of them. The articles were originally published in the MINING AND SCIENTIFIC PRESS.

Foundry Notes.

The Pacific Iron Works, as usual, are turning out a large amount of mining and other machinery destined to various localities. Among the orders recently filled and now under construction may be mentioned the following: A 60-ton copper plant for the New Jersey and Sonora Copper Co., at Nacasari, in Mexico; a 10-ton copper plant for the Presidio Co., of Chihuahua, Mexico; a 10-ton copper plant for the Dunchess Co., at Battle Mountain, Nevada; two 30-ton copper and lead plants for Australia; one 30-ton copper plant for the Copperosity mines, in Arizona; a heavy set of pumping and hoisting works, for the Washington Mining Co., of Forest Hill, Cal; an 80-horse power hoisting works for the Old Dominion Copper Co., of Globe, Arizona; a 14x36 Wheelock automatic cut-off engine for the Stockton Agricultural Works, and one of the same size for the Judson Manufacturing Co., of Oakland; a 10-stamp gold mill for the Buena Vista mine of Mariposa county; heavy sugar machinery for Mexico; general overhauling and repairs to the Government steamer "General MacPherson." They have also been sending out a number of the Baker horse power mining hoists, which seemed to be in great favor with miners in all parts of the country.

The Fulton Iron Works are building the machinery for three steamers. One of these vessels is to run between the Hawaiian islands. She will be 75 feet long, with 30 feet beam, and a depth of 12 feet 6 inches. Her engines will have 350-horse power, with a 30-inch stroke. The second steamer is for the Coos Bay trade. Her length will be 145 feet, with a beam of 26 feet 6 inches, and a depth of 13 feet. Her engines will be of 225-horse power, with a 20-inch stroke. The third vessel is a steam schooner 120 feet in length, 27½ feet beam and 10 feet deep. The engines will be of 100 horse power, with an 18-inch stroke.

Some 250 men are now cutting wood and burning charcoal for the iron mine at Hotaling, Placer county. They are trying the experiment this year of using "ground pits." The smelting works will be started up in about two months, when the roads are dry enough for transportation. They will have plenty of charcoal on hand to keep steadily at work. The company have thousands of tons of ore out and much more ready for extraction as fast as it can be handled. The product last year was 15,000 tons of iron, worth \$30 a ton, and it is expected to greatly increase that output during the present year.

The Union Iron Works have nearly completed the large pair of boilers for the new ferry boat Tiburon, which is to run between this city and the landing in Raccoon Straits. The machinery for the new boat is not new, but will be put in by the Union Iron Works.

QUICKSILVER.—On page 142 of the PRESS (Feb. 23d), in the article on "Our Mineral Resources," the district of Cerro Gordo should have been credited with an output of \$15,000,000. The sense of the text of the contract between the Rothschilds and Spain is as follows: The product of the Almaden quicksilver mine of Spain is pledged to the English banking house of Rothschilds to secure a loan of \$8,500,000 made in 1870 to the Spanish government, and payable in 30 annuities of 750,000 each. The Spanish government pledged itself to deliver at the mine yearly at least 32,000 flasks, the price to be regulated by the current London rate, but in no event to go below 46 per flask, say 37 96-100 cents per pound, to which is to be added transportation, expense of sale, etc. When the price is between 46 and 48 the surplus over 46 to be equally divided; when over 48 the Rothschilds receive one per cent and the Spanish government two-thirds of the surplus over 48.

THE STATE MINING BUREAU.—The museum of the State Mining Bureau, No. 212 Sutter street, presents many attractive features and goes far towards a representation of the mineral resources of California and the Pacific Coast. It is open daily from ten to three o'clock and is free to all. The number of daily visitors is not as great as one would expect from the interesting nature of the articles on exhibition.

A LARGE number of men en route for the Coeur d'Alene mines have turned back from Rathdrum, Idaho. At that point there are twenty men for every bed.

Manufacture of Woolen Goods.

How They Make Stockings and Under-clothes.

California has long been noted as a wool-producing region, and some of its articles of woolen manufacture have become recognized as the best in the world. Until within a few years, however, no attempt to manufacture lighter articles of apparel has ever been made here. In February, 1881, the California Hosiery Company began operations in Oakland, but was only measurably successful, owing to lack of experience of the management. For this and other causes, a complete reorganization was effected about a year since. The policy of the former managers was changed materially, and the mills started in to work goods that would sell, and as good as could be bought. The new management has succeeded in establishing a first-class reputation for the products.

A recent visit to these mills by a representative of this journal developed many facts of interest. There are about 125 hands employed, 75 per cent of these being girls. There are no Chinese on the pay rolls and never have been. The proprietors recognize the fact that they could have made more money with Mongolian help, but have declined to employ it.

Handling the Wool.

The wool is purchased here, and is cleaned and prepared in the mills. The bags of wool are opened and sorted by hand into four different grades, one man—an expert—performing this operation. Not all the wool of the same fleece, though it be a high grade of wool, is taken. Parts of the fleece, having a coarser fiber, are set aside for certain classes of goods.

Once sorted and separated it is kept separate, of whatever grade, till it comes out from the knitting machine. After being sorted the work is taken to a machine which "dusts" it, removing loose particles of dust and dirt. Then it is placed in a scouring machine. Hot soapy water is placed in a vat, having appliances for passing the wool along through it. This removes the animal grease, and much of the dirt. This process is called scouring. The wool is then dried by hot air, mixed and oiled. For the latter purpose lard oil is sprinkled over it. The wool is then ready for carding.

Carding.

Formerly the wool was fed to the machines by hand. Batches of regular weight were made up and started in, but now a feeding machine does this better and with great accuracy.

This is called Bramwell feed, and it is placed on the first of the carding machines which are called respectively "first breaker," "second breaker" and "finisher." The Bramwell feed automatically weighs out a certain quantity of wool and drops it to the "first breaker" or carding machine. The operation of the carding machines is so well known it is not necessary to describe it in detail. It straightens out the fiber, cleans off any burrs, sticks or lumps, and prepares the wool so it can be made into yarn. It passes from one to the other of these carding machines in a continuous fluffy coil or festoon about one inch or more in diameter, which is called "roving."

In the Oakland mills there are three sets of feeding and carding machines. The roving is wound automatically on reels, and taken to the spinning jennies, where it is spun into yarn. In all this work, only the yarn has been produced so far, and to make a perfect stocking, ready for market, for instance, there are 19 or 20 other processes. As many persons will be interested in this subject, we shall endeavor to describe, as briefly as may be,

How they Make a Stocking.

After the yarn is spun it goes to the winders, and is wound up on spools, ready for the knitting machines. Very few of the processes are simple. Knitting, for instance, is a manifold process. First, the leg of a stocking is knitted, and then, on another machine, the foot. If merino heels and toes are called for, other changes must be made for these, and if for ornamental merino stripes around the leg, still other changes.

In knitting the stocking, the machine knits a continuous cylindrical-shaped web as long as it runs, and it may be a couple of hundred feet in length. A girl cuts the cylindrical piece into lengths according to size of stocking it is to make. In doing this she throws away any of

the defective pieces, of which she makes a rapid examination during the cutting process. These leg pieces are then taken to other machines, which respectively put on the foot, heel and toe. Before doing this the pieces are "raveled," that is, the frayed edges are taken off, so that the little loops of the fabric can be readily put on the machine which fits the foot and heel. The machines for doing this work are marvels of perfect mechanism, but they require skilled labor to operate them. The loops of the fabric are deftly caught onto the hooked needles of the machines by the girls who have them in charge, and missing a single loop will make a defect in the finished fabric. After the heel and toe are closed, then the seaming is done. This means that the two pieces of the foot are closed together along the sides.

Rough mending follows. All the stockings are examined and mended and trimmed. The stockings are then taken to the dye vats, where they are dyed, if the yarn has not been first dyed, which is not usual with stockings. When they come out of the dye they are "hoarded." Thin pieces of board the shape of a leg and foot are prepared in various sizes; over these the stockings are slipped, as on a leg. These boards are then placed in a drying room, and the stockings dry on them. When the stockings are taken off these stretchers or molds they are of the proper shape and size for use. But still the process of preparation for market is not complete.

After being dried they are inspected carefully and the "fine mending" done, so that no imperfections may escape notice. Ladies' stockings particularly must be carefully examined. In buying, the gentle sex examine the goods very accurately, and as a general thing are apt to find any imperfection. When the finished mending is completed the stockings have to be "mated" or put in pairs. Then they must be "tacked," the toes and tops being tacked in pairs. They are then folded, pressed, stamped, labeled and boxed ready for market. The various methods of manipulation are very interesting.

The hosiery made at these mills is made wholly of wool, except the heels and toes, which are made of "merino," some cotton in these portions making the stocking wear better. The word "merino" originally meant the fine wool of the merino sheep, but usage has established this secondary meaning, so no one is deceived by it. While any admixture of cotton diminishes the usefulness of a stocking to the wearer in respect to warmth, it increases it in respect to durability, and enables the maker to put in certain pleasing effects of color in the dyeing. Vegetable and animal fibers require different preparations to take dyes. A knowledge of this fact enables the manufacturer to arrange for varieties of color in the finished fabric when the two substances are woven with the same stocking.

To knit a merino heel or toe into the foot of a woolen stocking, the machine is set to knit a certain number of courses of woolen threads, and, these courses knit, it stops. Then it knits another certain number of courses of merino, and again stops. Then it is taken off the needles. The process of mending, before referred to, may need more explanation. Sometimes, from the imperfect operation of one or more needles of the machine, a stitch or stitches may be dropped, which of course leaves a hole in the fabric.

This has to be mended, not in the ordinary household way with a darning needle, but with a sort of crotchet needle, by which the nimble-fingered young women close up the aperture with a perfect knit stitch that blends undiscernably with the machine stitches. The seaming, by the way, is done outside the factory by families who come and get the goods and return them when completed. Some of this work is also done in the Magdalen Asylum, on this side of the bay.

Other Articles.

In addition to the ladies' and children's hosiery of all kinds, men's half-hose, men's heavy socks, etc., the mills also make first-class underwear for boys, youths and men, ladies and misses. In making an undershirt there are several processes. The body is made on the machine as a continuous cylinder, like the stocking leg. After it is knit it is cut in lengths of suitable size (after marking). Then the holes are cut for the arms and the hollow of the neck is cut, and they are "grafted." The cuffs are "rubbed," the ends being sewed on. When

the arms are in, the shirts are "bearded," that is, put on shaping-boards and dried. The shirts are faced with linen, the button-holes made, and they are stamped, pressed and boxed. All these different processes are carried out by girls.

The various goods are made "on honor" of the very best material. When the stamp says all wool, they are 100 per cent wool. The result is they have plenty of business. Last year the difficulty was in supplying, not in selling goods. They pay out about \$50,000 a year in wages. The company's policy has changed since Mr. John Lee, the President, took hold of it. He is a practical, experienced man, with a knowledge of the details, which has been of great value. Having been for many years one of the most expert wool buyers on the coast, his skill has been of the greatest use to the company. The salesroom is at 31 Sutter street, in San Francisco. The officers are: John Lee, President; V. D. Moody, Francis Blake, Hugh A. Chase, Peter Thompson, Chas. W. Reed and E. T. Flint. Mr. John Williams is Secretary. There is no superintendent, the President and Secretary doing the practical management and attending to all details. A peculiar feature is that the mills do not shut down at noon, but relays of hands keep the work moving all day. The company is now well established in a prosperous and growing career. The mill is of brick, roomy, well lighted and ventilated. The operatives are in cleanly and healthy quarters, and have plenty of room in which to perform their work. The girls all live at home with their parents. The company is about putting in new machinery and extending the works materially.

Big Bend Tunnel.

Work in the Big Bend tunnel at Big Bend, Butte county, in this State, is being driven day and night with three shifts of men working eight hours each. It will be remembered that we described this tunnel scheme in the PRESS, December 17, 1881, when work was commenced. It is the intention to turn the water through the tunnel, so as to work a section of the Feather river where rich diggings exist. Work continues to be energetically pushed. During the past year the company built roads, put up a telephone line, built several wood roads to the timber, bought about 1,000 acres of land, and otherwise put matters in shape. The cost of constructing the tunnel has fallen within the original estimates. Mr. N. A. Harris is the superintendent and Mr. Cribbins the foreman. The president is R. V. Pierce, and secretary Jas. A. Roberts. The head office is in Buffalo, New York. The following is a summary of operations during the fiscal year:

The total number of holes drilled during the year 1883, was	11,124
The total depth of holes drilled was	58,598 ft.
Average depth of drilling	5,267 ft.
Time occupied in drilling	2,558 hrs. 38 min.
Average time per shift, of eight hours	2 hrs. 22 1/2 min.
Actual number of working shifts, of eight hours each	1,077
Number of drills sharpened	15,038
Number of car-loads of rock extracted	33,592
Average number of car-loads per shift	31.19
Number of pounds of No. 1 blast powder used	32,115
Number of pounds of No. 2 blast powder used	8,035
Average number of pounds of No. 1, per running foot	9.167
Average number of pounds of No. 2, per running foot	2.293
Total progress made in 1883	3,503 ft.
Average progress, per month	291.0 ft.
Average progress per day (359 days)	9.757 ft.
Average progress per shift of eight hours	3.252 ft.
Greatest distance made in July	375 ft.
Least distance made in August	175 ft.

For the first seven months of the year the tunnel was driven through a blue slate formation, which was good drilling and blasting ground; for the last five months it was driven through an exceedingly hard variety of rock, work at times being very seriously delayed by a strong flow of water.

PATRICK CAMPBELL, who controls the Golden Gate Hydraulic Mining Company, of Smartsville, was, on Monday, fined \$500 by Judge Keyser, of the Yuba county Superior Court for contempt of court in violating an injunction issued in the debris suit brought by Yuba county against the company. Campbell for a long time evaded service of papers and operated the mine in defiance of the injunction.

MR. SAMUEL J. HENDY was elected one of the Trustees of the Mechanics' Institute at the recent election. Mr. Hendy is an energetic young mechanic, strongly indorsed by his fellow workmen and others. His name has already been placed in an enviable position among mechanics and manufacturers by an older member of the family, and we trust the patronymic will now gain additional luster.

Industrial Notes.

The machinery for the proposed cotton mill at Oakland has been shipped from Liverpool and will be here within a few months.

Preparations for the new glass works at Oakland are going ahead. The ground on the marsh near the rail works has been leveled preparatory to drainage. The foundations of the buildings will soon be laid.

The prison labor contract system is about to be investigated by the Labor Bureau Commissioner. Furniture and harness manufacturers are those especially affected by the present system.

The jute mills at Oakland are running over time, and have 350 men at work. The jute works at the States Prison are lying idle for some reason.

The proposed woolen mill enterprise at Galt has been given up for the present.

The Los Gatos Fruit Packing Company last season employed some ninety hands.

The Oakland Nail Works put a number of new hands at work on Monday, in place of those who struck a short time since. Although more disturbance was expected none occurred.

On Monday last nearly thirty of the leading cigar manufacturers of this city, representing a capital of several millions of dollars, closed their doors upon over 3,000 of their Chinese laborers. This course was adopted in pursuance of an agreement entered into between them as members of the Pacific Coast Cigar Manufacturers' Association. This association is held together by fines and penalties so binding that any infringement of their rules would be ruinous to the signers. Its organization was due to the fact that the Chinese cigar makers have formed trades unions, and by a series of strikes in different factories, and by openly disrespectful conduct to their superiors have made life intolerable to their employers. It became a question who was to be the boss—the capitalists or the heathen Chinese. For some time past the leading manufacturers have been anxious to supplant Chinese labor with that of white girls and boys, as being more reliable. The manufacturers propose to send to New York for white cigar makers, and keep them altogether, shutting out the Chinese entirely.

At Turner's ship-building yard, near Benicia, there are several vessels in process of construction, one of them an auxiliary steam schooner for northern waters.

Local builders are working on several new yachts. John Purvis, of Oakland, has nearly completed a 40-foot schooner, which has just been sparred and rigged. Wm. Stone has on the stocks a 40-foot schooner, which is completed but has never been launched. He has a 40-foot yawl also which is nearly done. This vessel is quite narrow, according to the types in ordinary use here, and is also pretty deep; she will carry a center-board, however. She will soon be ready for launching. He has partly completed a 47-foot schooner, which will be used for pleasure purposes. Stone's yard is now quite a busy place. In addition to the yacht builders' work, the boat builders are busy. Griffin is working on a fine new lapstreak harge, which is to go to Stockton for a new club. Vice is at work on ships' boats. Twobig has work ahead of him, and Robertson is building a wherry. Farmer, of Oakland, has just finished a finely-built lapstreak yawl boat, and is now repairing the Fleetwing.

The cannery at Collinsville is working thirty-three Chinamen, making cans for the coming season. It is said they intend making between 1,500,000 and 2,000,000 cans.

The Oakland Woolen Mills is having made a new set of boilers, and is making arrangements to have a brick stack built, the plans for which have been drawn. A lot of new machinery is on the way from the East for these new mills, which will add to their capacity.

ALLEGED GOLD DISCOVERIES.—An Albuquerque, New Mexico, dispatch announces new and rich discoveries of gold and copper are reported from Hell canyon, eighteen miles from this city, and a rush to the Sandias is likely to be the outcome of these discoveries. The Sandias are known to have been worked hundreds of years ago by the natives, some old-time shafts with the rude, notched log ladders being still in existence. Many mining claims have been located in this range by our citizens, but the lead in which this rich find is reported is the only one on which work has not yet been done.

Bodie.

FROM OUR TRAVELING CORRESPONDENT.

Bodie as a district has its advantages that are worthy of special mention. Its geological formation is very favorable for genuine mineral veins of permanent character, the country rock being mainly a porphyritic dyke. The external shaping of ground where nearly all the mines are situated is such that neither the scientist nor his partner, the practical operating miner, could easily suggest any change of shaping that would be accepted by others as any improvement, or more convenient, for the mining and milling machineries.

The altitude is great, insuring them some advantages in deep mining, and though more elevated than the top of Mount Davidson, yet it has its railroad for wood and lumber supplies passing along above all these principal mines and mills, bringing ample supplies of very good wood and lumber from vicinity of Mono lake, about 30 miles distant. This railroad is now considered a valuable adjunct and security for the town's indispensable wants, and will still more benefit it when it passes on a little farther to connect with the Carson and Colorado railroad at Benton, and thereby enable passengers and freight to go by continuous rail from San Francisco to Bodie and to or near to all the long line of mining districts that reach nearly to the Colorado river.

The Railroad.

The Carson and Colorado railroad is proving to be a great benediction to a large scope of country that, for lack of such advantages, would long have remained unimproved. This road, when completed to Colorado river, will allow the tourist to see the Sierras on the Central Pacific railroad; then, by the Carson and Colorado railroad, from Reno pass through a very pleasant grazing, mining and agricultural country, giving ample opportunity to see Nevada's deepest mines, and perhaps as perfect and efficient mills and hoisting machinery as has ever been erected in any country.

The terminus of this road, at Colorado river, will introduce the tourist to some of nature's grandest scenery. The Grand Canyon of the Colorado above the Needles is a grand climax of stupendous grandeur. The Atlantic and Pacific railroad, that connects at Needles with the Southern Pacific, conducts the visitor to Peach Springs Station, within eighteen miles of the Grand Canyon, where Young & Co. have ample accommodations to make the trip one of comfort and enjoyment, for the 18 miles staging is in a canyon toll road, and one of constant descent and affording many interesting views. This new route through Arizona on the 35th parallel is one that has great inducements for students and pleasure seekers who are crossing the continent. But to return to Bodie. The little staging now required to get there after leaving the town of Hawthorne is not a hardship worth mentioning, even in this very snowy winter, for Cluggage carefully boxes you up in tight coaches, and piles you up with blankets and fur robes, till you feel semi-tropic; and if the snow is too deep for wheels, you are transferred to a sled, and pass on up into the upper clouds where the Pacific coast fogs are all beautifully crystallized, and stored up in vast snow supplies for summer use.

After each installment of these crystals, here called snow, the toll road man goes over the route with a supply of willow brush, and plants them in the snow, as a guide to the driver, just where he must drive to keep over the old tracks far below him.

These guide services are much appreciated. So Mr. Cluggage pays the road company \$3,600 a year toll for their making the road, and thus showing where to hunt for it when lost. It would be an omission too great to overlook the well-equipped foundry and machine works of Messrs. Wells & Co., now engaged on machinery for a new quartz mill, and supplying the various wants and repairs on the works and mills now running. They are prepared to cast and finish very heavy pieces, saving much time, and also utilizing the metal that is already in the camp.

Bodie is Favored

In having a very intelligent population of perhaps 1,000 (though they claim 1,800). The fact that they support a morning and also an evening daily is proof enough of their intelligence, and much evidence that the papers are each live papers, and some would draw a strong inference that the editors and proprietors themselves have much faith that Bodie is not either dead nor about to die, but is to be a brilliant-producing camp yet for years to come. Families remain and endure the winter snows, because they have good schools. The School Superintendent of Mono county, Miss Naomi Angel, of Silver City, Nev., is in charge of one department of the city school, where she is highly esteemed as an able educator.

So I will now leave Bodie in the angelic sphere and go down, down, down, to the warm city of Hawthorne, at the head of Walker lake.

B. W. CROWELL.

CONSUL LAMBERT, of San Blas, has written to warn American laborers that they will not better their condition, but accomplish the direct reverse, by leaving the United States for Mexico, trusting to find employment there.

Smelting Notes from Chihuahua, Mexico.

At a recent meeting of the American Institute of Mining Engineers, Mr. W. Lawrence Austin, of Santa Barbara, Mexico, read the following "Smelting Notes." In the southwest corner of the State of Chihuahua, hidden up in the foothills of the Sierra Madre, lies Santa Barbara, a small collection of adobe dwellings, which claims for itself a history dating back to the middle of the sixteenth century. For many years the mining and reduction of ores have occupied the attention of the inhabitants of this region, but of late interest in these pursuits appears, from some cause, to be lagging. Like every other respectable old ruin, it is haunted by traditions of past glories, and is interesting to the engineer from an archaeological point of view, even if the millions represented to be hidden in its mines do not present to his technical vision the allurements others see. Occasionally the discovery of a pocket of rich ore in the vicinity awakens it from its venerable dreams, and it was such an occurrence that led the writer recently to intrude on its seclusion.

This district was of mature growth, and is lasting in its old age, differing somewhat in this respect from our Western regions. Where the American will move on in search of better things, the Mexican crouches among the ruins. The decadence of the industry here may be traced to several causes, among which are the exhaustion of the docile surface ores; the primitive methods of reduction, which do not admit of operations on an extended scale—in other words, the economical reduction of the ore; and lastly, the lack of systematic development of the mines themselves, which prevents the extraction of these low-grade ores when connected with any serious expense.

The Appearance of the Veins

Is imposing. Huge quartzose ledges, carrying zinc-blende, galena, and the various pyrites as impregnations and seams, cut through the country rock for miles, their jagged outcroppings occupying a prominent place in the landscape. They present some features which might cause the metallurgist to reflect before embarking in any scheme for their reduction. Zinc blende predominates; iron ores are wanting, if we except the pyrites; the local supply of fuel is limited to a certain amount, too small for ambitious designs; the gangue is quartz pure and simple, and the average assay shows a very low grade of ore. Such objections may have been among the reasons why so many of these mines have lain idle these many years; so that now, upon inquiry as to who made the enormous excavations, a shrug of the shoulders, and the response "los antiguos," are all that can be elicited.

Some of the descendants of these mystic beings, more ambitious than their fellows, earn a livelihood by hand-sorting, or concentrating the better portion of what their ancestors left behind, preferring this to starvation; but we did hear a bilious party remark, that had they selected the latter alternative, it would have been the nobler of the two.

The Concentration

Is carried on in what is termed a planilla; that is, a man goes to the brook, or rather to a point where the brook pokes its head up through the waste of the river bed—for, in the dry season, the current is usually bidden from view—levels off a space four feet by four feet on the bank, and paves it with flat stones, giving the whole a slight inclination toward the water. He then surrounds three sides with a wall of other flat stones, set on edge, about twelve inches high, places his fine ore in the upper end, stands off in the stream and bails the water on to the afore-said mineral, throwing it in such a way as to cause the whole mass to be lifted by it. The lighter particles are borne away by the returning current, while those of sufficient gravity remain behind. In this simple apparatus the desired separation of the quartzose matter is effected quite sufficiently for smelting purposes, although there is naturally a considerable loss of the valuable minerals. The greater part of the ore smelted is hand-sorted only, obtained by following the best streaks of mineral in the mines, and selecting therefrom again the most valuable portion.

At present there are twelve blast furnaces in operation in Santa Barbara, each of one ton capacity, but eleven of these are running on ores brought from outlying mines or other districts, and yield, in their concentrated form, 36 ounces to 66 ounces per ton. A smelter of considerable experience in this district assured me, that ores containing less than 40 ounces to the ton cannot be profitably worked, but that as soon as they reach 53 ounces they are in bonanza.

The Largest Works

In Santa Barbara—in fact, the only ones of any consequence—are leased and operated by Mr. A. B. Sawyer, and the following notes are mainly condensed from information furnished within those adobe walls. Here are in operation eleven shaft furnaces and four cupellation hearths, all, together with the buildings, constructed of adobes, *i. e.*, sun-dried brick. These adobes are usually 9 inches by 18 inches, and $\frac{1}{2}$ inches thick, but larger ones are used in covering the cupellation hearths, for instance, which are 30 inches by 12 inches, and $\frac{3}{4}$ inches thick. One man can make about 75 of these first-named adobes in a

day, and is paid 60 cents wages, so that they come to something under one cent each.

The following measures of weight and value will be given in avoirdupois pounds and United States coin. The Spanish pound does not differ enough from the American unit of the same name to make any essential difference in these calculations, and the Mexican copper currency dollar, which alone is in circulation in this district, is calculated, to avoid small fractions, as the equivalent of 80 cents United States coin, whereas in reality it is worth nearly 81 cents.

The Adobes Used in Furnace Construction
Are made from selected clay of a red color, free from small stones. They can be laid in wall at about \$16 per thousand. The furnaces are set in pairs, under hoods or domes about 30 feet high and discharge their fumes, smoke, etc., through their open tops into the working spaces. These domes require for their construction 1,500 adobes, and cost about \$40, independent of the price of the adobes. The furnaces are constructed by building up adobes from the floor to the height of 7 or 8 feet, leaving a rectangular shaft, inclosed on three sides, but with the fourth free. This shaft, from the top downward for 4 or 5 feet, is of small dimensions, and constitutes the shaft of the furnace; below this it widens out. When the furnace is ready for blowing-in, the fourth side of the shaft is walled up, and the enlargement below tamped solid with clay. The bottom of the shaft slopes outward and forms a basin, partially outside the furnace, in which the molten products from the furnace fall and separate. This basin or slag bath is divided by the adobes of the front wall of the shaft, which dips below its surface about an inch. The shaft, when bricked in and ready for operations, has the following dimensions: 4 feet from tuyere to top, 12 inches from tuyere to surface of slag bath, 12 inches square at tuyere and 18 inches square at top. The tuyere ($2\frac{1}{2}$ -inch nozzle) is fitted into a copper plate (18 inches by 29 inches), which constitutes the lower back of the furnace, but usually porphyritic rock is used for this purpose. A pair of these furnaces, from the floor up, require for their construction about 500 adobes, and two days' labor, divided as follows:

Cost of Constructing One Pair of Shaft Furnaces.

One mason at 80 cents.....	\$1 60
Two helpers at 40 cents.....	80
Two boys at 20 cents.....	40
	<hr/> \$2 80
Tamping in crucibles:	
Six men at 40 cents, two days.....	4 80
500 adobes at 1 cent.....	5 00
Clay and smudges.....	1 40
Total.....	<hr/> \$14 00

This represents the total cost of a pair of furnaces, exclusive of tuyeres and copper back (which is not necessary), and divided by two, puts the cost of each singly at \$7.

Operations are conducted as follows: Charges are laid out, each of 150 pounds, made up of 75 pounds of ore and 75 pounds of litharge. With these 150 pounds are charged 150 pounds slag and 45 pounds charcoal, *i. e.*, the fuel is 60 per cent of the ore charges, rather more than less. This whole amount is not charged at once, but doled out in hatfuls to the little furnace. The mouth of the shaft is kept free from sparks. Blast is supplied at $\frac{1}{4}$ -inch pressure (water) for 19 $\frac{1}{2}$ -inch nozzles by a No. 6 Sturtevant fan. Bullion, matte and slag flow continuously into the sumps, separating there; a crust of slag is removed as often as it chills, and the other products are tapped off as often as a new charge is begun.

Oak charcoal is used exclusively, and costs \$8 per ton, pine charcoal being considered too light for the work. From 1,100 to 1,300 tons of charcoal are consumed in these works per annum. From another source I learn that the total consumption of charcoal in Santa Barbara mining district in 1882 was 1,750 tons, which amount represented all that could be produced. This gives an insight into the amount of ore yearly benefited in the district. Accepting, as it is variously estimated, the fuel to represent from 60 per cent to 65 per cent of the ore smelted, we find this latter element covered by figures lying somewhere between 2,700 tons and 3,000 tons, 1,000 tons of which are brought in from other districts.

Cost of Smelting One Ton of Ore.

Labor:	
2 Smelters at 60 cents.....	\$1 20
2 Chargers at 20 cents.....	40
Laying out charges.....	10
Carrying away slag.....	10
Roustabouts.....	20
	<hr/> \$2 00
Fuel:	
60 per cent of ore charge.....	4 80
Total.....	<hr/> \$6 80

This is exclusive of general expenses, blast, repairs and superintendence.

(CONCLUDED NEXT WEEK.)

The mysterious explosion of a very innocent-looking glass ball belonging to a New York gentleman, has called attention to the fact that the bits of annealed glass sometimes found lying about the floor of a factory are dangerously liable to explode, and should not be carelessly handled. They are never sold, but persons sometimes take them away for their beauty's sake.

The Cœur d'Alene stampede is having a visible effect on the trade of Missoula. The *Missoulian* is informed that last week one firm had not a day's sales last month of less than \$1,500, ranging from that sum to as high as \$2,500.

The Cœur d'Alene Mines.

As so many thousand miners are interested in news from the new mines in Idaho, we have collected from various sources the following information:

One man writes to a partner in Leadville and says: "There is no use for any of you boys to come here now. The snow is five feet deep, and it won't be off until the 1st of May. The gulch is all located. On the country all around it flour is worth from \$50 to \$60 per hundred pounds. You can't get any freight taken for less than 30 cents per pound. There won't be anything done until spring. As for the mines, there is nothing certain about them, for the gulch is not open yet. Some gold has been taken out of two claims on high bed-rock. Wages are \$6 per day, and that is all. I will go back in a few days to the mines and do the best I can. I wish I had remained at home until the 1st of May."

The Butte (Montana) *Inter-Mountain* says: It is time that parties going to the Cœur d'Alenes should be apprised of the true nature of the Belknap townsite scheme. It is a swindling enterprise. It is widely advertised as the point from which it is advantageous to leave for Pritchard gulch. The Townsite Company, by newspapers and flaming posters, announces that a first-class wagon road is being constructed on easy grades to Eagle City. On the strength of this information hundreds of people leave the trail at Belknap, intending to start for the mines, and learn only when too late that they will have to lay over one day and then continue down the road to Trout Creek or Spokane. To build a road, or even a trail, from Belknap to the mines, is declared by those who know to be physically impossible. The completion of such an enterprise would cost a million dollars. The Belknap townsite outfit is raising the present excitement merely to sell town lots which are worth nothing for a good deal of money. People who desire to go to the Cœur d'Alenes will find it immensely to their advantage to give Belknap the "go by."

The Walla Walla *Statesman*, which is in as good a position to know as much about the new mining region in the Cœur d'Alene mountains as any other disinterested and impartial newspaper, published in the interior, offers the following reasonable reflections on the subject: As the snow becomes deeper in the new mines reports grow larger in comparison, and the early days of Florence, Boise Basin and Alder Gulch are nowhere along side of it. Previous to winter setting in nothing was heard of the immense riches: Pritchard creek was supposed to contain some gold, but how much was not estimated, as bed-rock in the creek had not been reached, yet no sooner had the frost baked the earth and snow covered it, rendering prospecting an impossibility, than the wildest rumors began to be circulated—and believed by those who knew no better. The *Statesman* has no wish to condemn these new diggings, but at the same time it does not intend to use its influence toward getting up an excitement which will do the country no good. A quail on toast is worth a hundred in the brush, and we advise all who can make a living elsewhere to remain where they are, or untold suffering will ensue. At present there are hundreds of scheming adventurers, whose sole object is to encourage men to go in. As a rule these men know nothing of mining, and readily lend themselves to all the speculators who are interested. If they can write letters to the newspapers so much the better, but as a general thing they dare not sign their names to the letters they write; yet their opinions are paraded in print as if they were old 49ers. A few days since we read in the *Portland News* what purported to be an interview with Platt Burr, in which he stated that one claim owner was so anxious to show him how well his claim paid that he actually shoveled off the snow from his claim for a long distance, set his sluices and cleaned up a large sum. If this ever happened we are willing to wager that if the truth were known the sluices were salted on him, but it is the most improbable thing for a miner to do, especially in the dead of a hard winter, and no experienced miner will be misled by such a statement. When a man has a good claim he does not care to tell about it, but if he has a poor one he may possibly do it, but then he's going to make sure that something is going to come out of it, and "salts" it. We have no doubt that it is a great mineral country, and the possibilities immense, and for that very reason we don't care to see men going in at this early season that can do nothing. They will return disgusted and give the country a bad name, and by their reports keep out good prospectors, and thus retard the development of the mining resources. Nothing can be done until the snow is off the ground, and that cannot be done until May or June next.

Matt Gillespie of Bodie, received a letter from J. M. Ellis concerning the new mines, which is published in the *Bodie Free Press*. Gillespie says: On the morning of the 9th I took my departure in company with eight companions, who were as eager to face the mountains of snow which loomed up in the distance as I was to become a Cœur d'Alene millionaire. We labored hard all day, climbing steep mountains and crossing narrow valleys densely covered with timber and snow, until we sighted

in the far distance what we supposed to be Eagle City, the coveted place, where we arrived at 9:15, and were greeted by acquaintances from nearly all sections of the country, who, like myself, were in search of the yellow dust, but who had already become millionaires "in their minds." On the morning of the 10th I was shown everything that was to be seen. Business seemed to be well represented. I am in possession of some very fine specimens. The placers are only visionary problems to be worked out after six feet of snow disappear. It will take time and labor to expose the untold wealth in the Cœur d'Alene.

A correspondent of the *Oregonian* writes to that journal a very comprehensive letter, from which we make the following extracts:

At Cœur d'Alene everything is hurried and on a large scale of preparation. Stores are going up, with such slight assistance as the carpenters afford, at an astonishing rate, and every man here tells me they will be ready in three weeks to care for and fit out with supplies the 50,000 pushing pilgrims that they confidently expect to see traveling through during the spring and summer. Most of the men here managing investments in stores and hotels have had experiences in other instances of mining excitements in California, Nevada, Colorado, New Mexico and Montana, and they certainly ought to know what they are about. I hope they do. Last night I met Mr. Pritchard, the discoverer of the gold that calls together so many fortune seekers, and had a long talk with him. He said he first found gold in 1878 or 1879, I do not exactly remember which, and that he let into the secret his partner in a hay ranch on Mud Prairie. This led to the letting in of another partner, and the next thing Mr. Pritchard knew Gerard and Gillette appeared in the mountains with Mr. Markson, a stranger. Then he became uncommunicative, and the others began to doubt the presence of gold in paying quantities. I asked him as to the various trails into the mines, and he said there had been much wild talk about all of them. "Of course," said he, "I think this the best way in, otherwise I would not be on my way through Cœur d'Alene with my family; and," he added, "these pack trains you see going through every day will get there in better shape than those who are hunting for a short trail over the mountains." He believes that the Trout Creek trail is a feasible one, but said that it was made to rise fully a thousand feet higher than it need to. The Heron siding trail has been pretty much given up as impracticable, if not impossible, and the new Belknap trail, Mr. Pritchard thinks, will be "soft and impassable," as he expressed it. So far as I can learn by diligent inquiry, their claim that the Northern Pacific Company is aiding and abetting in the Belknap boom is not founded on fact. I cannot find a railroad man who will admit it. The easy ride from Rathdrum here and the steamboat from here to within eight or ten miles of Eagle City will settle the dispute when it comes to undertaking the continuous and heavy freighting that must be done.

Captain Haines, an officer of the fort, told me yesterday that he felt certain that gold in rich quantities would be found on the St. Joe river, a stream which empties into the lake not far from the north fork, up which the steamer will run on its way to the landing below Eagle City. The map issued by W. B. Ayer & Co., of Portland, will give a fair idea of the relative situation of the points mentioned. Captain Haines has been about here several years, and seems to understand the lay of the promised land pretty well. Of course, the finding of gold on the St. Joe would give the glittering prize for sudden wealth an extra glitter.

A practical miner, an ex-resident of Eureka, Nevada, writing to a merchant of that place, says: "Now to the point, and to be brief, the country has not been prospected for quartz, although there have been several locations made, both gold and silver. The specimen gold quartz is very rich. All the quartz claims that have been found are near the trails adjacent to the placer mines. In one or two instances the discovery was right in the creek bed, at a point where the waters have been washing the ledge, then traced to the mountains. It is the unanimous opinion of experienced miners that this will be a great quartz country, and there are many of them lying here for the purpose of being on hand early in the spring to prospect for it as soon as the snow goes off. The placer ground already discovered lies on the two creeks, Pritchard and Eagle. On Pritchard there are fourteen to sixteen miles of placer ground."

STEAM WAGON.—We hear that the steam wagon which is being used by the Lester Mining Company for the purpose of hauling ore from the McCracken mine to their mill at Signal, a distance of nine miles, is working to perfection. This means of transportation has been successfully used in Scotland, and we see no reason why it should not be just as effective in Arizona.—*Mohave Co. (Arizona) Miner.*

The steady development of our mines is a thing that is fixed. We are no longer a people looking for brokers to find us purchasers for mines. We have turned, too, in good earnest, to develop our own mines, and the late disclosures show the wisdom and safety of so doing.—*Pinal, A. T., Drill.*

THERE are 2,000 passengers at Sprague, on the Northern Pacific railroad, snow-blockaded en route to Cœur d'Alene.

THE ENGINEER.

USEFUL INFORMATION

DE LESSEPS AND HIS ENGLISH FRIENDS.

Recent newspaper statements convey the information that M. de Lesseps has come to some sort of an understanding with the English objectors to his plans in relation to increasing the capacity of the present ship canal across Suez. The agreement was made November 30, 1883. The most important points are: To prevent delay in the transit of vessels through the canal, the company will either enlarge the present canal or construct another, and a committee of engineers and shipowners are to be appointed to study this question, half of whom shall be English. To provide for the establishment in London of a consulting committee of the ten English directors, and for the opening of a London office where dues shall be payable; to provide that in future appointments to the Company shall largely increase the number of English-speaking officials. The other clauses abolish pilotage dues, and propose a progressive reduction of the ordinary transit dues, until the minimum of five francs is reached.

A SHIP RAILWAY ACROSS SUEZ.—Dates from Athens of January 10th, says the London *Standard*, state that a scheme has been presented to the Porte by a Mr. de Leon, representing large American interests, which is intended to replace Admiral Ingfield's project of connecting the Mediterranean and Red seas by submerging the Jordan valley. This new scheme consists of the construction of a ship railway, which, starting from El Arish, on the Mediterranean, would have its terminus on the Akaba, on the Red Sea. The actual cost of the line—as it would pass through a perfectly flat country—would not amount to an exaggerated sum, although the expense of keeping up the permanent way, consequent upon the transport over it of vessels of heavy tonnage, may be so great as to render competition, on even terms with its Suez rival, somewhat difficult. In the event of a successful issue of the present negotiations, Mr. de Leon is likely to be rewarded by the American government with a high diplomatic post at Constantinople.

THE ELECTRICAL RAILWAY IN BAVARIA.—The *Schweizerische Bauzeitung* records the fact the first electrical railway in Bavaria was lately put in operation. The railway in question forms a connection between the Breunheim station and the large sawmill of Herr Steinbeiss, and the immediate purpose of its erection was to facilitate the transportation of lumber to and from the mill. The gauge is normal, and the length of the road is about one kilometer (about three-fifths of a mile). The motive power of the locomotive is a Schunkert dynamo-electric machine of four horse power. At night, when the railway is not in operation, the machine is utilized for the lighting of the mill by means of Edison incandescent lamps.

THE HENNEPIN CANAL, which is designed to open steam navigation between the Mississippi river and the great lakes—if it is ever constructed—will be eighty feet wide on the water line and seven and a half feet deep. Congressmen Miller's bill calls for an appropriation of \$1,000,000 to prosecute the work. Some evasive St. Louis writer says that nominally the canal is intended to promote commerce in the Central Western States, but incidentally by it is noticed that it will draw the waters of Chicago's unclean river down into the Mississippi and perhaps save the Garden City the large sum she now pays for pumping.

MEXICAN RAILROADS.—An approaching event of considerable importance is the completion of the Mexican Central Railroad Company's main line to the United States. This event is announced officially to take place about the middle of March. The road will be open for through traffic between April first and fifteenth. The connection by rail of the City of Mexico with the railroad system of the United States is an achievement which will undoubtedly mark the beginning of an era in Mexican progress and prosperity.

THE BALTI SHIP CANAL.—The new ship canal, which is to connect the Baltic and North seas will save nearly six hundred miles of water journey now made around the Danish peninsula. The cut, as proposed, will be from Cuckstadt to Kiel, and the length will be about half of the Suez canal, or some fifty miles. As in the Suez canal, there are several small lakes lying in the way, which will be utilized by the engineers.

ENGINEERING MEDAL.—We notice that the American Society of Civil Engineers has honored Mr. Wm. P. Shinn with the Norman medal for 1883, in recognition of the value of his papers on "The Increased Efficiency of Railways for the Transportation of Freight," and "How Can Railways be Made More Efficient for the Transportation of Freight?"

AN IMMENSE TUNNEL, two miles long and hewn out of solid rock, has been constructed by the city of Boston to carry off the sewage from that city, which has heretofore been emptied into the river and harbor immediately adjoining the business centers, and greatly to the detriment of the public health. This work has cost \$4,500,000.

THE LATEST NOVELTY connected with a ladies' toilet is luminous jewelry. M. Gaston Trouve, the well-known electrician of Paris, has lately designed a series of ornaments for ladies' wear, which consists of glass colored and cut to imitate rubies, diamonds, etc., fitted in an envelope surrounding a small incandescent lamp of low resistance. The light shines through the pieces of glass only, and gives them all the appearance of the stones they are intended to imitate. The lamp is fed from a small battery which is carried about the person. It is composed of three pairs of zinc carbon plates (two carbons to one zinc), or a larger number, according to the current required. These plates dip in a saturated solution of bichromate of potash, which is contained by an ebonite cell with three compartments. The plates are fitted into a cover, which is kept securely down on the top of the cell by two bands of India rubber passed around the whole. Finally, the battery is encased in two sheets of gutta percha, so as to entirely prevent any leakage. A miniature switch is carried in the pocket or elsewhere within reach, to which the battery and lamp wires are connected. The pressure of a finger on the arm of the switch makes or breaks communication with the lamp. The battery weighs (with six plates) 300 grams, and will work about thirty minutes with a two or three volt lamp. A larger battery to work a four or eight volt lamp weighs 800 grams.

THE PRODUCTION OF A GREEN SURFACE UPON ZINC OBJECTS.—In order to coat zinc articles with a permanent light to dark green species of enamel, a solution is prepared by dissolving 50 gm. sodium thio-sulphate in 500 cc. boiling water, and adding thereto 25 gm. sulphuric acid. The sulphur which precipitates is filtered off, in the resulting clear, warm solution the articles to be enameled are immersed. A short immersion results in the production of a light-green, smooth coating of sulphide of zinc. A longer digestion in the above solution at a temperature of from 65° to 85° C. yields a tougher and more shining enamel of a dark gray tint. The articles are then washed in water and dried. The enamel-like surfaces lose their luster and become lighter in color by immersion of the articles in dilute hydrochloric acid. An appearance like that of black marble is easily obtained by applying an acidified solution of sulphate of copper with a sponge. A more brownish gray is obtained by replacing the solution with one of 15 grms. chrome alum and 15 grms. sodium thio-sulphate.—*Cotton, Wool and Iron.*

ROLLERS VS. MILLSTONES.—At a recent meeting of the London (England) Society of Engineers, a lecture on roller milling was followed by an animated and interesting discussion. A practical miller gave notice that a certain power used in his mill produced with burr runs 550 sacks of flour, while the same power was sufficient for 900 sacks since the introduction of rollers. He claimed that the first failures of the roller mills in England were due to the deficiency in the purifying apparatus of that time, and not the rollers. If it is claimed that the burr will successfully compete with rollers, such an assertion is correct for certain kinds of grain. But England has to rely upon those kinds not well adapted for the burr, and a challenge was issued to the advocates of burr stones to produce with it a flour from Indian, Russian, or American spring wheat, as good as that obtained by rollers.

CARELESSNESS WITH BOILERS.—The recent explosion of a boiler in a Rochester, N. H., shoe factory is one of those regularly recurring cases of either criminal carelessness or extreme stupidity which have always been, and we regret to say, very probably always will be, prominently connected with steam-boiler management. One of the daily papers, alluding to the accident, graphically described it by stating that the engineer "hung a brick on the safety-valve lever, with the aim of raising an extra quantity of steam. He raised it; likewise the building." We need add nothing in the way of explanation, and only regret that, after all that has been said about the dangers of overweighing safety-valves, the practice should still be indulged in to so alarmingly great an extent.

THE FANCY GLASS BUSINESS.—At Gaudenfel, Germany, the artist and glass spinner, A. Frenkel, of Vienna, has established his glass business, offering carpets, cuffs, collars, veils, etc., made of glass. He not only spins, but also weaves glass before the eyes of the people. The otherwise brittle glass he changes into pliable threads, and uses them for making good warm clothing by introducing certain ingredients, which are his secrets, and thereby changing the entire nature of the glass. He makes white, curly glass muffs; also ladies' hats of glass, with glass feathers, which are lighter than real feathers. Wool made of glass, it is said, cannot be distinguished from the general article. Glass is a non-conductor, and the time may not be far distant when it will cause a revolution in dress material.

FLOUR MILLING.—The most notable feature of the mill furnishing trade at this time is the increasing demand for larger plants. The pres-

ent small mills have a capacity of from 50 to 150 daily capacity. There are a hundred such mills in the West to one of 500 to 1,000 barrels or greater capacity, and as yet not nearly so large a proportion of them have been overhauled and put in the best shape for work according to the latest ideas. It is evident that these mills must put themselves in condition to do as good work as their larger neighbors, and their owners seem to generally realize it. The result will be large sales of machinery and furnishings, and another active season in the mill furnishing business.

HOW IS WHEAT WINTER KILLED?—An old grain man who has had years of experience in all the important winter wheat growing sections of the country, broached his theory on the winter killing of fall sown wheat in a recent conversation with an exchange. It is to the effect that wheat is winter killed frequently by smothering; that too much snow is worse than too little, and that even a light covering of snow on which a crust has formed is more fatal than hard frosts with no snow at all. Perhaps some of our readers located in the winter wheat sections can shed some light on the subject.

SIXTEEN LEADING INVENTIONS. The following are said to be the sixteen American inventions of world wide adoption: The cotton gin, the planing machine, the grass mower and reaper, the rotary printing press, steam navigation, the hot air machine, the sewing machine, the india-rubber industry, the machine manufacture of horse-shoes, the sand blast for graving, the gauge lathe, the grain elevator, artificial ice making on a large scale, the electro-magnet in its practical application and the telephone.

FRUIT AND VEGETABLES.—There is no absolute distinction between fruit and vegetable, fruit being that part of the vegetable kingdom found growing upon stalks or trees, and containing the seeds, and sometimes being the seed itself, whereas all organic nature not animal is said to be vegetable. In common parlance our soil-grown products for culinary use are called vegetables, and some that are really fruit are also called vegetables. The terms overlap so much by customary nomenclature that distinctions become difficult.

COAL TWO THOUSAND TWO HUNDRED YEARS AGO.—Theophrastus, a Greek writer who flourished in the fourth century before the Christian era, in a work entitled "Book on Stones," describes an earthy substance which would kindle and burn, and which was used by smiths. There can be no doubt that he refers to coal, and that this is the earliest passage in which that substance is expressed or mentioned.

GOOD HEALTH.

Pie-Plant an Unwholesome Food.

It has long been known that pie-plant, or rhubarb, contains in its stalks and roots, particularly in the former, a considerable amount of oxalic acid. According to a recent analysis made by B. W. Damon, Ph. C., as reported in the *Physician and Surgeon*, the fresh stalks of rhubarb contain 0.19, or nearly one-fifth per cent of free and combined oxalic acid.

A year or two ago we undertook some experiments at the Sanitarium for the purpose of determining the effect of this vegetable upon the system when used as food. As the article was used upon the tables of the Sanitarium two or three times a week, we first directed that it should not be used for a week, then made careful examination of the urine of some thirty patients. Crystals of oxalate of lime, the form in which the acid is usually found when present in the urine, were found in a few specimens only. We then allowed the use of rhubarb in the form of sauce for one meal, and made another examination of the urine of those cases in which the oxalate had not been observed in the previous examination. Oxalate of lime crystals were found in abundance in almost every case.

This experiment proves that the oxalate acid found in pie-plant is a substance which cannot be used as food, and must be eliminated. It is also well known that calculi are sometimes formed from oxalate of lime crystals in the bladder, and that the presence of this abnormal element in the urine is often associated with grave disorders of the general system. These facts seem to us to be sufficient to condemn the use of the article as food. During the coming season we shall make still further investigations of this subject, and at some future time report the result.

Long Life.

The subject of longevity is always one of great interest to everybody. "Live forever" is a favorite salutation in some countries. In the old times people found great delight in imagining their heroes gifted with continual life and unending bloom of youth. With what breathless interest one follows Ponce de Leon as he plunges into the wild forests of Florida in the fruitless search for the fabled fountain. With the advance of civilization and the scientific study of disease and medicine, and the better understanding of sanitary conditions and laws,

there has been a steady increase in the average life of the individual. Governments are studying how best to promote length of life. Those who lead sober, peaceful lives, free from all great troubles and strong excitements, are surest of the coveted length of days.

Some time ago the French Government sent a circular letter to all the districts of that country to collect information as to those conditions of life which seemed to favor longevity. The replies were very interesting, but on the whole rather monotonous. The general result was that longevity is promoted by great sobriety, regular labor, especially in the open air, absence of excessive fatigue, easy hours, freedom from galling poverty, a philosophical mind in meeting troubles, not too much intellect, and a domestic life. The value of marriage was universally admitted, and long-lived parents were also found an important factor. A healthy climate and good water were mentioned. All this agrees with common sense, unless the idea that the intellect is a hindrance to longevity be considered unreasonable, and we know that some of the most intellectual men have lived to a great age.

Interesting researches concerning the comparative longevity of men and women in Europe have recently been made by the Director of the Bureau of Statistics at Vienna. From these it appears that about a third more women than men reach advanced age. This seems corroborative of what was said above. Women often live than men lead quiet, regular lives. They have fewer bad habits; are less exposed to strong passions and excitement. —*Potter's Monthly.*

SALT FOR THE THROAT.—In these days, when diseases of the throat are so universally prevalent, and in so many cases fatal, we feel it our duty to say a word in behalf of a most effectual, if not positive, cure for sore throat. For many years past, indeed we may say during the whole of a life of more than forty years, we have been subject to a dry, hacking cough, which is not only distressing to ourselves but to our friends and those with whom we are brought into business contact. Last fall we were induced to try what virtue there was in common salt. We commenced by using it three times a day, morning, noon and night. We dissolved a large tablespoonful of pure table-salt in about half a small tumblerful of water. With this we gargled the throat most thoroughly just before meal time. The result has been that during the entire winter we were not only free from coughs and colds, but the dry, hacking cough had entirely disappeared. We attribute these satisfactory results solely to the use of salt gargle, and most cordially recommend a trial of it to those who are subject to diseases of the throat. Many persons who have never tried the salt gargle have the impression that it is unpleasant, but after a few days' use no person who loves a nice, clean mouth, and a first-rate sharpener of the appetite, will abandon it. —*The Household.*

LAUGHTER.—Laughter is one of the best physicians known, being as necessary as pure air to invalids, hypochondriacs, persons suffering from nervous exhaustion, and those prostrated by business cares and mental worries. He is a gay companion, a foe of gloom and death; for, being a disciple of Moliere, joy, brightness and health accompany him everywhere. His treatment is simple and applicable to all ages. He never makes any charge for his services, and he is always ready to come when sent for. His face wears the brightest of smiles, which are in themselves better than most of the drugs in the pharmacopoeia for curing certain diseases, and his presence is sufficient to rouse the weak and lethargic into new life. Invalids should consult him as often as possible if they would lighten their burdens, make their lives longer and happier, and defy the approaching hand of time, which spares no one from its withering influence. —*Bow Bells.*

WHITE OR DARK FLOUR.—Careful analysis proves more and more conclusively, according to the *Mueller Zeitung*, that it is poor economy to leave the bran and other impurities in the flour, and that the notion about black bread being cheaper than white is simply a fable. One of the best chemists of Austria, Mr. Max Ruebner, states that, independent of its better taste, the white bread is more economical than the black, because a larger portion of it is digested; in other words, a smaller quantity of white bread is needed against a larger quantity of black bread to satisfy the demands of the body. This is not in accordance with the usually accepted theory.

BLOOD IN EVIDENCE.—The danger of toxicological search for blood with too hasty a conclusion has been instanced by Dr. C. Hasson. A man was arrested for murder. Some stains on the blouse were supposed to be human blood, but an examination revealed that the globules from their size were those of the blood of a rabbit. Certain stains on his shirt which had appeared suspicious had been proved to be derived from the dye of the clothing, modified by sweat and atmospheric moisture.

THE TELEPHONE INJURES TO THE EAR.—Some Springfield (Mass.) physicians are speculating upon the influence of the telephone upon the sense of hearing. They have found several cases wherein disease of the ear has been aggravated by using it.



MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

RICH.—Amador *Sentinel*, Feb. 23: The St. Julien mine has developed such extraordinary richness that it has been concluded to dispense with the hand mortar, that has heretofore served for a mill, and accordingly the one stamp mill of the Tripp mine has been shipped to the St. Julien, and carpenters and millwrights are now engaged in its erection.

ANOTHER RICH STRIKE.—*Dispatch*, March 1: We learn that a body of very rich rock was struck a few days ago in the South Spring Hill mine, near Amador City, at a depth of about 600 ft. The ledge is about six ft wide, and the rock shows free gold in large quantities. There is every indication that this mine will soon prove to be as valuable as its neighbor, the old Keystone.

UPPER RANCHERIA.—George Evans and R. A. Jeffries have completed laying a half mile of pipe to work on the Smith flat ridge. They have a fine prospect. Also Evans and Fitzgerald are about ready to start up their old and faithful claim. Geo. Browning is also piping. As soon as the Volcano ditch is ready to supply water the old town of Upper Rancheria will have the music of three hydraulics. Strickland, Hughes and McCane are under full headway. Glenn & Co. have their claim in splendid shape, with two pipes under way, with a fine bank of gravel in front. Dick Rule is also making a start on his claims and has hopes of finding some more of those lovely pieces, such as this part of the county has plenty.

PLYMOUTH.—Amador *Ledger*, March 1: Everything is bustling in the neighborhood of the new mine now being opened up at Enterprise. The music of hammer and saw, with the ringing chorus of pick and shovel can be heard all day long. Mr. Ballard of San Francisco is superintendent, and Pa. Delaney foreman.

MISCELLANEOUS.—A. L. Stewart & Brother had six tons of rock from their claim below the Confidence, near Butte City, crushed lately, which yielded \$15 per ton. Another crushing of 6 tons averaged \$20 per ton. There is about 25 tons of ore on the dump, which is expected to yield much higher. W. E. Stewart had 2½ tons of quartz from his claim near Big Bar bridge, crushed at Tripp's one-stamp mill, which surrendered \$10 per ton. The owners of the St. Julien have purchased the one-stamp mill of Herman Tripp, and have moved the same from Big Bar to their claim at Middle Bar, where it is now in course of erection. In pushing the tunnel ahead, a new character of ore has been struck. Specimens shown us consist of almost solid yellow sulphurets. They carry little if any gold, but they are taken as indicative of the near approach to another rich pocket. Ore richer than any heretofore encountered, and showing plentifully in free gold, has been struck in the South Spring Hill. The particulars we have not learned.

Butte.

AFTER THE DUST.—*Gridley Herald*, Feb. 27: Frank Martindale returned to town from the scene of his operations at placer mining, Tuesday. His partner, Frank Mack, having deserted him, Martindale's visit is for the purpose of getting some of his acquaintances to go in with him and work the claim for all it is worth. W. H. Jennings, Arch Taylor and J. Brown have decided to "take stock" in the enterprise and will go to the claim in a few days. Brown is a '49er and "saves" the business. Under his instructions we expect the boys will accumulate lots of dust. About a quarter of a mile of ditch will have to be constructed in order to ensure an ample supply of water. When it is finished they will have all the water they can use the year round.

Inyo.

IMPORTANT MINING SALE.—*Inyo Independent*, March 1: Frank Silva has sold to the Southern Development Company of Nevada 1,500 ft in the Sterling mine, the Vasco mine, Sterling Springs and Harbin Springs, in New Coso Mining district, consideration \$10,000. James Oliver has just completed the survey. The Southern Development Company has plenty of capital at its back, and the people generally are glad to see it become interested in Inyo county mining properties. It will stimulate prospecting and induce capital to invest in our mines.

ANOTHER MINE SOLD.—We are informed by parties just down from Bishop Creek that J. B. Swearingen sold to Eastern parties during last week the mine formerly known as the Golden Wedge, in Piute district, for the sum of \$8,000.

BROWN MONSTER.—Work on this mine has been closed down for the present, we understand. What object the owner of this property has for so doing, is beyond our ken, and is certainly a surprise to all who know of the merits of the mine, paying ore in large quantities having been extracted all winter, and there being plenty more in sight.

DARWIN.—Renewed energies are being put forth in this old camp, and men are preparing for work on many of the old mines. A large amount of freight has gone in there the past week. Everybody feels good, and it will be no very great surprise to see a large force of men at work in that vicinity this summer, lively times and plenty of money.

ARGUS RANGE.—M. R. Williams, superintendent of the Argus Range Mining Company, has returned from San Francisco. Work will be pushed on the Company's mines. Some changes are being made in the mill, and it will soon be ready to start up.

Mariposa.

HORNITOS.—Cor. Mariposa *Gazette*: The old Washington mill is soon to be shut up, and although this old mine of 20 years' standing, with so good a record, was closed down on account of the failure of an experiment with some new-fangled mining machinery, after an expenditure of \$25,000, there are still a large number of persons who regard it as one of the best kinds of mines. At the No. 9 their 20 stamps are pounding away as usual. The Gaines mine supplying the ore, is proving itself to be one of the best mines in the State. Mr. Huling, the enterprising owner, is now in the East making arrangements to considerably enlarge his plant, move his mill to the outlet of the Barrett ditch, to run by water power with tramways to all the new company's

mines. The ditch is already purchased and in process of enlargement, and preparations are being made to build the tramway from Quartz mountain to the mouth of the ditch at the junction of Cotton creek and Merced river. Mr. Barcroft of the Enterprise mine already has his mill here, and only awaits good weather to commence its erection; we bespeak for this mine a great future. Further south on the confines of our township, is the old and well reputed Gonzalez mine, and near it the Del Oro, both owned by an Eastern company and being worked by Mr. Houghton, one of our oldest citizens and mining men. We hear it stated that some eastern parties are in treaty for the Brooks mine. I believe this to be an A one mine, and hope to soon record it as a producer. It is on the same belt, about midway between the Gonzalez and No. 9.

Mono.

ANOTHER STRIKE.—*Free Press*, Feb. 29: The strike on the 306 level of the Bodie has been occupying the attention of the stock market for nearly two months now, and no great amount of thought has been given to the Vulcan ledge on the 206 level. This ledge was intersected by a crosscut near the north end of the Bodie mine, and at the point of discovery consisted of two veins, about six ft apart, the easterly vein being about two ft wide of very fine ore, and the westerly about a foot wide. The Vulcan runs parallel with and between the old Bruce and Burgess ledges, to which it bears a strong resemblance in the appearance and character of its ore. A drift was started south on the Vulcan from the crosscut, wide enough to take in both branches of the ledge, and requiring two square sets to take up the space. This drift is now about 50 ft long, the easterly vein continuing to show the large amount of ore. Everything, however, is taken out and milled, the porphyry between the two veins, as is usually the case about our rich ledges, being so strongly impregnated with silver as to constitute good ore. A winze was started on the westerly, or smaller branch of the ledge, and it is now down about 25 ft. The ore has been growing steadily wider and richer as the winze has gone down, and at the bottom it is four ft wide, of as fine ore as any one would wish to see. It is the regular old-time stuff, such as gave Bodie its first reputation, in 1878. As the poorer branch of the ledge has done so well in sinking this short distance, it can only be conjectured what the better branch may be at the same depth. R. K. Colcord, Supt. of the Syndicate, and C. A. White, Supt. of the Champion, took a look at the new development yesterday, and pronounced it a very important one. At the 306 level there is little change in the main upraise. The stopes are yielding rich ore faster than the mill can crush it. In this connection it is gratifying to state that Supt. Irwin, who is now in San Francisco, has obtained a lease of the Bodie Tunnel mill, which has been recently overhauled and is in splendid condition to work, and that Marden's teams will commence to haul ore to it. The Bodie Tunnel mill is of fifteen stamp capacity, nearly new, and has all the latest improvements and appliances for reducing ore thoroughly and economically.

NOTES.—*Homer Index*, March 1: There will probably be not less than 200 men working in and about the May Lundy mine by the 5th of May. This mine ought and can be made to yield several hundred thousand dollars the present year. All it needs is a little well directed development or opening work and additional milling facilities to place it on a dividend footing equal to that of the sturdy old Standard of Bodie. It is the intention of D. E. Jones, Superintendent of the Virginia Creek Hydraulic Mining Company, to start up his works at the Old Mono diggings just as soon as the spring thaw now in progress releases sufficient water from the Virginia creek basin. The vein from which Wm. Mayes and Pat. Donahue are extracting ore, the same that was cut 80 ft in by the Josephine tunnel, west of the Homer group, is proving to be one of great value. The ore vein is now 20 ft wide, and the ore is improving in quality. The outlook is that there will be an unusually large number of prospectors in the mountains to the south and southwest of this place the coming spring. Mike Noonan and Johnny Landy are steadily pushing the tunnel in the Hyena vein in Lake canyon, and with very encouraging prospects. It is expected that Orlando Fuller will shortly return from the other side of the Sierra, and resume work on his Mount Gibbs mines. The hydraulic miners of Mono Lake valley will have an abundant supply of water the coming season. Work was resumed in the Great Sierra tunnel, in Tioga district, last Monday.

Nevada.

GOOD PRODUCER.—*Transcript*, Feb. 23: The last crushing from Eagle Bird quartz mine in Washington township yielded over \$7,000, the mill being a small one. The vein has increased from six to 7½ ft in sinking. The ore shows a good deal of free gold and averages about \$25 a ton. The sulphurets, which near the surface assayed \$360 a ton, assay \$480 in the bottom of the workings. This is a comparatively new mine, having been in operation but a few months; but it bids fair to give large returns to its owners as the development of it is pushed ahead.

WASHINGTON TOWNSHIP.—*Foothill Tidings*, Feb. 29: If Washington township, in Nevada county, were as far off from any place as Cour d'Alene, there would be a rush of miners to Washington township, for the purpose of looking for and locating quartz ledges. But it is of easy access and has an endurable climate, and though it has the gold bearing ledges its pleasantness of situation prevents its being attractive. Again miners have been in Washington township since early in 1850, and a quartz mining boom has not, in all the time since, been very great. Some quartz there has been successfully worked and a number of ledges been scratched a little; but real and good quartz mining, except in one instance, has not been done. There is a good field for the miner and prospector. The fact that the ground has been occupied by miners for many years is nothing against there being rich ledges. We can remember that where the Idaho mine now is, miners walked over the ground for years and did not see the ledge under the surface. There are larger ledges in Washington that are known to bear gold than is the Idaho ledge, and the fact that miners have walked over those larger ledges is not a proof that good paying mines cannot be found there. It is digging, and not walking and talking, that makes a mine.

Plumas.

THE GREEN MOUNTAIN.—*Plumas National*, Feb. 23: From parties from over the ridge we learn that

the Blake chimney, recently tapped by the lower tunnel, is proving better than was expected, and rumors of \$30 rock have been flying around. This is probably an exaggeration, but there is no doubt but that the rock is rich enough, and that a large pay chimney has been opened, which will keep the big mills at work for years. The tunnel taps the ledge to a depth of over 400 ft below the lowest workings, and not only proves the Green Mountain good at great depth, but establishes the fact that the ledges in that section increase in richness as depth is gained. It is a very valuable development for the Green Mountain, and places it on a secure and solid basis.

PROSPECTS WELL.—*Greenville Bulletin*, March 1: In the Halstead mine at Rich Gulch a drift has been run on the ledge fifty ft; at present the ledge is nine ft wide, and samples of ore taken from any part of it prospect well. The representative of the Plumas Eureka Co. at the mine is said to be satisfied with the prospect. A very pretty gold specimen taken from the Riverdale mine, near Quincy, resembles a bunch of grapes.

San Bernardino.

GARFIELD.—*Calico Print*, Feb. 26: The Garfield mine has been put in good shape for operations, with new chute, ore bin, tramway, assorting platform and shed, car track, lodging houses, office, etc. Work is progressing smoothly day and night, with satisfactory results so far as shown in the milling returns. Thirty miners are employed in and about the mine, including eight ore sorters. No sinking has been done below the lowest level—the last tunnel driven in at a depth of 100 ft—except a shaft of 26 ft sunk in the same. Operations in the mine now consist in finding the ore wherever it may exist. Considerable dead-work is accomplished in reaching the ore deposits, but when ore is found it is generally so rich that it pays a good average profit. The indications of finding ore in the mine are as good as they were from the start. Within the past few months 600 tons of ore have been milled that yielded returns on an average of about \$125 a ton, and several shipments to San Francisco of first-class ore gave very rich returns—sometimes as high as \$1,000 a ton. The prospects of the mine are as bright as ever, and under the able and experienced management of James Patterson, the Supt., it will be developed to the fullest extent of its resources, and continue what it is now, a success. The Sue mine is being worked by three men who have struck no ore since they passed through the rich pocket that created so much interest in the mine when it was first opened. Work is still progressing in the Mountain Brow, and it is reported to be looking as well as ever. Messrs. John McCullough & Co. have commenced work on the Buckeye adjoining the Mountain Brow, and the croppings look well enough to cause them to hope they may strike a rich deposit before they shall have proceeded very far.

San Diego.

THE HUBBARD.—*Cor. San Diego Union*, Feb. 26: I called at the Hubbard mine, Banner, and with the Cowles brothers, managers and part owners, went through all the old workings, and also inspected the work of sinking the air shaft which has been so much required at this mine. For several years the lack of an air shaft has kept this property from being among the best paying mines of this section. The new shaft is now down 55 ft. They have about 40 ft more to sink before the connection is made with the old works. Then they will have some pure air to breathe—something never before had in the mine, although parties have been working at it for many years. About three years since the old works were abandoned, the air being so foul and hot that the men could not work. From William Cowles I learn that he expects to make the connection inside of two months. Then this district will have one more paying institution that will not be dependent upon a few inches of rain.

Sierra.

NEARING COMPLETION.—*Sierra Tribune*, Feb. 27: The mill at No. 9 tunnel, of the Sierra Buttes mine, is getting well along toward completion. This will be without doubt the finest built quartz mill in California. The pipe which will convey water from No. 8 tunnel to the mill is nearly all laid.

COMMENCED WORK.—Martinet & Kane have a force of men at work preparing to build a flume and ditch to the proposed mill site at the Kentucky quartz mine. The water is to be taken from the river, about one and a half miles distance from where it is intended to erect a ten-stamp mill next season. A larger force of men will be put at work as soon as practicable. The Kentucky prospects as well as any mine in this district and the enterprising owners have good reasons to expect big things from it.

IN GRAVEL.—The tunnel at the Blue Gravel mine is in fine looking quartz gravel. One hundred and seventy ft of tunnel have been run under the present contract. The contractors have but 27 ft further to run. When that is completed the owners will sink a shaft to bedrock, which it is supposed will be reached in 15 or 20 ft. The mine is situated at an altitude of 6,000 ft. The snow is seven ft deep at present.

PAY GRIT.—Messrs. McFarlane and McIntyre were down from Bunker Hill last week and reported that gravel had been encountered in the Ballarat claim, at a distance of about 300 ft from the mouth of the tunnel. These gentlemen say that it will take several months to open out the mine for profitable working.

PREPARING.—*Mountain-Messenger*, March 1: The miners throughout the county are preparing for spring operations, much encouraged by the water season insured to them by the recent favorable storms; and the gold yield of Sierra will be unusually large this year. Mr. Vanslyke has rented the Hog canyon quartz mill for a year, and as soon as the weather will permit will put it at work on ore from the Maxson ledge. The Kentucky Quartz mine will soon be developed by Martinetti, at Sierra City. Water will be carried from the river for one and a half miles to the site of the proposed ten-stamp mill to be put up this spring. This promises to become valuable mining property.

BLUE GRAVEL.—We hear that the Blue Gravel Co., at Sierra City, are in good looking gravel, that augers well for the future prosperity of the mine. A shaft will soon be put down to bedrock, supposed to be about 20 ft below the main tunnel.

BALD MT. EXTENSION.—The Bald Mt. Extension Co. cleaned up, last Sunday, 183 ounces, \$3,403.80, making a total of \$5,372.37 for the last two weeks' run. The water for sluicing is steadily increasing

these warm days, and Supt. Lawry has increased his working force, picking gravel in the breasts. The indications are favorable for the main tunnel to soon be through the lava flow, there being sillage and large boulders. The prospects of the Extension are growing brighter for a prosperous future. Since the above was put in type we learn that the total gold receipts for February will foot up about \$10,000, and dividend No. 2 will be declared of probably three cents a share.

NEVADA.

Washoe District.

ALTA.—Good headway is now being made in the main east drift on the 2150 level. The material encountered is largely quartz. The west drift on the same level has been cutting some stringers of ore, and the whole of the material encountered is of a favorable character. The machinery is all working well and smoothly. The pumps very easily handle all the water that is coming into the mine when running at but six strokes per minute.

IMPERIAL.—The timbering of the main drift on the 600 level has been finished. It has reached the vein in the old ground, and a north lateral drift is now being run. This drift is at a distance of 572 ft from the Imperial shaft, and is developing quartz yielding good assays. The drift will prospect the Alpha and Eschequer as well as the Imperial ground. All these mines will doubtless soon be yielding milling ore.

GOULD AND CURRY.—The joint Best and Belcher winze down from the 2500 has reached the 2700 level. A station is being excavated at the 2700 level, and is about completed.

HALE AND NORCROSS.—A large working station has been constructed at the 2800 level and a drift started east. This drift is out only a few ft, but it is showing a very favorable formation. The ground is of an open character, showing heavy seams of clay and other material of a kind in which ore may live and wherein an ore body can find space to expand.

COMBINATION SHAFT.—The shaft has now reached the 2800 level. It is to be continued to a sufficient depth for a sump, when a station will be excavated at the 2800 level and a drift started west for the Hale and Norcross. When this is done sinking will be resumed and the shaft continued down to the 3000.

CROWN POINT.—Are again at work with a full force of miners. The mills on the Carson river are all thawed out and running right along. There is now an excellent milling stage of water in the Carson river, and the mills will be able to run steadily for some months—until the water fails next fall.

YELLOW JACKET.—A full force of men is now at work in the mine, and the mills on the Carson river are running to their full capacity. A great amount of ore has been opened up, and there are likely to be no more stoppages for some months.

BEST AND BELCHER.—The joint Gould and Curry winze below the 2500 has now reached the 2700 level, where a station is being cut out, and is about completed. It is in birdseye porphyry. In this rock a substantial station may be constructed.

UNION CON.—The usual progress is being made in east crosscut No. 1 on the 3100 level, and on the 2900 the air-way is in a distance of 60 ft. This airway is for the mutual benefit of the Union, Mexican and Sierra Nevada mines.

BELCHER.—A full force of men is now employed in the mine, and all the ore that the mills on the Carson river are able to reduce is being taken out. A large amount of ore has been opened up in the mine.

SAVAGE.—The ground into which the main north drift on the 2600 level is passing is of a promising character. A good deal of quartz, all of which carries more or less metal, is being encountered.

OPHIR.—Ore is being extracted on both the 150 and 250 levels. On both levels several prospecting drifts are being run. The ground is being thoroughly explored to all points of the compass.

UTAH.—On the 1750 level the northeast drift is still cutting quartz that carries some metal, and which is of promising appearance. Some repairs have been making to the incline.

CALIFORNIA.—The joint station on the 2900 level is completed, and a joint Con. Virginia station is now being cut out on the 2700 level for the purpose of putting in a double hoist.

CON. VIRGINIA.—The station on the 2900 level is completed, and a joint California station is now being cut out on the 2700 level for the purpose of putting in a double hoist.

Belmont District.

PROGRESSING.—*Belmont Courier*, Feb. 23: Work in the Belmont mine is prosecuted with energy. Agent Asa B. Eastwood informs us that the mine is looking well and that good ore is encountered as the work of development advances.

Bristol District.

NOTES.—The furnace has been shut down for short periods during the week in consequence of the pumping machinery giving away. The fue arrester, known in camp as "Jumbo," exploded several times during the week, causing quite a panic among the employees. Some of the boys employed on the upper deck of the furnace have been turning their stomachs inside out, in consequence of the dense fumes from the feed-holes, which lead us to think that the healthfulness of Bristol is a thing of the past. The Day Smelting Co. have reduced the wages of their employees to the standard of the Utah smelters, which is \$4 for furnacemen, \$3 50 for helpers and feeders, and \$3 for outsiders. These rates are altogether too low, considering the amount of labor required of each man around the furnace. The Day Co.'s furnace bids fair to make a long and prosperous run, under the able management of foreman Richard Walsh. Mr. Walsh thoroughly understands the art of reducing base ores to a paying basis, and pointed out to the writer the mistakes made by the Bullionville Smelting Co. in their treatment of the tailings and Day ore, the latter proving so refractory that they had to give it up, some seventy tons remaining on their dump.

Columbus District.

MACHINERY FOR COLUMBUS.—*True Fissure*, March 1: A carload of material for the new mill at Columbus arrived by rail the other day. It consists

of a new boiler, steam drum, mud drum, furnace front and smokestack. The crushing part of the mill, or more properly the pulverizer, is already set up in the old foundry building, where the above material will also be placed. R. E. Doran, the Supt., expects to have everything in readiness to start up about the first of next month. The result of the workings of the new pulverizer are looked forward to with a great deal of interest, as its success will inaugurate a new process of working ores in a cheaper than way that now in use. This will be of incalculable benefit to remote districts where the rates of transportation are so high.

COLUMBUS CON.—Preparations for working on the ore, at various places in the mine, will be completed by the first of the coming week, when the work of extraction will be resumed. The drift from the shaft on third level will soon be in such a condition that a considerable amount of valuable work can be done through it, and from it in the way of prospecting. The seam of ore in the drift started from the south crosscut on the 150 level still continues, and remains about the same as when last reported. The work of sinking the shaft has been discontinued, and the work on the fourth level has been stopped. All the work in the mine is being done on the 150 and third levels.

MOUNT DIABLO.—The work of sinking the incline is going along slowly; thus far about 30 ft has been excavated. This work has been done on the first and third levels. In a day or two the preparatory work will be finished on the second level and an upraise will be started on the incline there.

Eureka District.

A NEW FURNACE.—Eureka *Sentinel*, Feb. 26: Workmen are employed at the Eureka Con. works removing the old No. 1 furnace and are digging out the bed for a new furnace. The dirt taken out for a depth of four or five feet is rich in lead that has stolen through the furnace bottom in the course of years, and will more than pay for putting in a new foundation. When the new furnace is constructed, it will be for the purpose of reducing the speiss on the slag dump. The style and the plan of it have not yet been determined on.

Pittsburg District.

CONTRACT.—*Battle Mountain Messenger*, Feb. 26: Lewis is nearly sure to come to the front again as a bullion producing camp, there being over 500,000 tons of ore in sight in Pittsburg district, which will assay from \$80 to \$500 per ton, and being wet crushing ore it can be reduced at a cost of about \$25 per ton. A contract is about complete, we understand, between the Dahlgren Mining Co. and D. P. Pierce, of San Francisco, to reduce 200,000 tons of ore from the Dahlgren mine. Mr. Pierce is an old Nevada and a thorough mill man, and has leased the Highland Chief forty-stamp mill and will put it in running order by the 1st of March.

Taylor District.

SNOW.—*Cor. White Pine News*, March 1: We have lots of snow, so much that the ore teams of the Argus had to discontinue hauling, and as a consequence the company's mill had to shut down. This also had the effect to knock off several miners. But all this is only a temporary necessity. Every indication here seems good for lively times next summer, and our people seem satisfied with the outlook. They do not hanker after any far off excitements.

Tuscarora District.

THE NAVAJO.—*Times-Review*, March 1: In an interview with Supt. Price last evening, he informed our reporter that he was raising the big pump from the 650 to the 550 level. His reason for doing this is that from the bottom level is too long a distance to raise the water at a single lift, and consequently that economy and expedition demanded the change. He said it would have to be made at any rate in the near future, and he considered the present the best time for its accomplishment, as he was short of sage-brush fuel and would have been obliged to suspend operations on the lower level in the course of a couple of weeks on that account, or else take cord-wood from the mill, which would shorten the supply there, besides proving doubly expensive. The cease of the water flow from the mine necessitates the temporary closing down of the mill. Mr. Price thinks that the water will raise to the 550 by the time the pump is in readiness, which will be in about ten days or a couple of weeks, when the stamps will again be started up. As soon as an additional supply of sage-brush can be obtained, the lower level will be drained again by means of a sinking-pump, and the work of crosscutting for the ledge resumed. The drift is now in 90 ft from the shaft, and according to the surveys, the ledge ought to be within 50 or 60 ft of the breast. The formation is similar to that of the levels above, and consequently it is a reasonable inference that the ore body continues to the lower level.

CHANGES.—*Times-Review*, Feb. 27: There were a number of important changes made in the force at the Navajo mine yesterday. Rube Norton assumed charge as foreman, Frank Leland as chief engineer and F. H. Klaine as night engineer. There were also a few changes made in the underground force. There are various rumors afloat in regard to the reason for the change, but as none of them apparently emanate from official sources, they are probably mere surmises of the authors, who are not directly interested in the matter, and who know but little about it.

ARIZONA.

MATTERS IN MOJAVE CO.—*Miner*, Feb. 26: John McEwan, John Granfield and R. M. Jones are working on the Poverty claim at Cerbat, a new location, and have some six or eight tons of ore out. P. Hach has a carload of ore sorted ready for shipment from the Infallible mine at Stockton. H. S. Carpenter will soon commence shipping ore from the Rattler mine at Chloride, fine galena claim. During December and January last seventy-two carloads of ore were shipped from Kingman, which, including the shipments from Hackberry, will make the total amount shipped from this county in the last sixty days about 1,000 tons. The miners on Stockton Hill are very anxious to have a siding put in opposite their camp, and have sent in a petition to the railroad authorities for that purpose. Parties are offering to haul ore from Stockton to the proposed siding for three dollars per ton, whereas it now costs twice that to haul to Kingman. The McCracken mill is running on tailings for the present. They are pan-

ning out well. There will soon be quite a force of men at work on the Elkhart mine at Chloride. There is a prospect of some of the best property in the San Francisco district changing hands very shortly at handsome figures. The Matilda mining company are putting up their 30 ton smelter about six miles above Planet on Williams fork. There is considerable stir in the old Aubrey and Owens districts at the present time, and a great many new claims are being discovered. Considerable mining property is changing hands at very fair prices, and some of the boys have made small fortunes by recent sales.

FAVORABLE.—*Prescott Courier*, Feb. 27: Never before, since the first settlement of Arizona by white people, has our section had as favorable a season for successful placer mining as the present. In former wet winters, cold, freezing weather generally accompanied the water, froze up the gravel, the sluices, etc., and made washing in the high mountains almost out of question; that is, in the months of January and February; yes, often in March. As water, this year has mostly fallen in the shape of rain, placer miners have been able to continue work from day to day, the result of which is a pretty fair crop of gold. If they have not been able to work in deep places in their claims, they have had plenty or high bedrock upon which to operate. In "dry" diggings, such as Weaver and Placeritas, work has gone on uninterruptedly. The principal gravel diggings of the Prescott region are in Big Bug, Walker, Hassayampa and Black canyon districts. Sluicing and piping are the modes here used to wash out the gold. We place the number of men now working placers in the county at 400, and we are within the bounds of reason when we place the gross yield, per day, of gold, at \$1,000. This is not a large sum, but, as the saying goes, "everything helps." When it is known that our deepest and best gravel deposits are as yet untouched, it is pleasant to contemplate that, for years to come, placer mining in Yavapai county will be one of the county's paying industries. Quartz mining is now a little quiet. Deep snow in the mountains has put a check upon this industry. Still the United Verde and Copper Mountain Smelters have been active, and the Black Warrior mill, as well as that on Groom creek, have been kept at work. Several other mills and works are waiting for snow to melt, when they, too, will start in taking out bullion. Mine owners who ship their ores to Pueblo, Colorado, and Benson, Arizona, have their shifts of men constantly employed taking out good ores. They must be good or they would be unable to meet the expenses of mining, shipping, working, etc. In looking around through the country, more especially at the mining interest, we fail to see anything that is in the least discouraging. Besides mines now yielding, scores of other mines are so fixed that they can be profitably worked when we shall have a railroad to aid us in the business. Take Big Bug district, for instance, or say, for an example, the Dividend, the Ticonderoga, the Galena, Eugene, Belcher and other mines we might name, have paid and are yet big with pay ore. Walker districts' best mines have never yet been fairly tested. The same is true of mines in Bradshaw, Turkey creek, Hassayampa, Walnut Grove, Antelope and many other districts. Give this section a railroad and the intelligent miners, smelters and mill men the road would bring us, and the output of our mines would very soon be the talk of millions of people. Isolated as we are; feebly as we mine and do other work, in the face of great obstacles, our contribution to the world's stock of precious and useful metals has been favorably commented upon, both at home and abroad.

RICH.—*Prescott Courier*, Feb. 25: A letter from Mr. D. C. Thorne, one of the owners of the Silver Belt mine, Big Bug district, says the ore bodies continue large and rich. Mr. Wm. Gavin, one of the owners of the Pine Spring mine, Turkey creek district, was here recently. The mine, he said, is yielding better than ever. Rich ore—horn and native—is being taken from a place on the ledge 400 ft from the first, or discovery shaft. United Verde company's workmen have struck it very rich in the Hampton mine. Silver is now plentiful in the newly discovered ore body. Immense pieces of copper ore are being taken from bottoms of the shafts and cuts in Copper Basin. They come from below the conglomerate, and add new testimony to prove that C. C. Bean has the largest deposit of copper so far found in America. Silver bullion from the Black Warrior mill, is being sent East. The Messrs. Clark are pleased with mines and mill in Groom creek district. We bear good reports from placer miners throughout the county. A large majority of them are making fair wages; the remainder are doing still better.

QUIJOTOA.—*Cor. Tombstone Epitaph*, Feb. 26: On the west side of the Big mountain is located Pie Allen's Quijotoa city, which at present numbers about 50 people. On the east side is Logan City, which has about 400 people and many good business houses; while the town of New Virginia City joins on to Logan on the east, and bids fair to become the principal town. There are no Chinese in the camp. Water sells at four cents a gallon, wood \$5 a cord, potatoes four cents a pound, flour 35 per hundred, all drinks 12½ cents, and the coal oil can be seen floating on the top of the glass; meals every where 50 cents, and nearly everyone eats about once a day, the bill of fare consisting of eggs, ham, steak and fish, all for fifty cents. This is on account of the large number in the business. Messrs. Kibber and Csanade have just received five dry washers, and are putting men to work about three miles from here placing. The artesian well at this place is down 300 ft, and no water. The first water struck hereabouts was found yesterday at a depth of 45 ft, on the Casa Grande road about six miles from here.

COLORADO.

A NEW STRIKE.—*Colorado Miner*, Feb. 26: The Norway is the name of a new discovery. It is located on the western slope of Leavenworth mountain, just opposite the Baltimore tunnel. The ore is a sulphuret and galena, and ran, at grass, from 200 to 400 ounces silver per ton. This is one of the lodges opened up by the grade of the Georgetown, Breckenridge and Leadville Railroad. The fortunate owners are McAyley, Hilyard & Co., and they intend to develop it and see what it is there.

DAILY DISTRICT.—We are pleased to learn of the healthy condition of mining affairs in this district. The Monarch lode, on Red mountain, is looking well. The main adit is 148 ft in length, and is run on the vein. The face of this adit is interspersed

throughout with mineral. It is being pushed forward under the management of W. Ebert. As soon as the weather permits an iron car and T rails will be put on and the adit continued with all possible speed. The character of the ore found in this opening is a bright galena, pyrites of copper and iron. The Garfield Silver Mining Company is the possessor of five other claims, in close proximity to the above, which they intend to largely develop in the early spring.

EAST ARGENTINE.—Mr. A. E. Bonham was down last week from the Cloudland district, and reports it as one of the most promising in the county. A number of the mines are being worked this winter, and continue to produce considerable high grade ore.

HANNA MOUNTAIN.—We learn from Wm. M. Pinckard, the manager of the Hardscrabble mine, that a force of miners is busily engaged in pushing the work of development, and that the prospects are very flattering. Thus far all that has been done is development and exploration work; the owners, however, are much elated over the present condition of affairs, and the work still continues.

LINCOLN MOUNTAIN.—Hanna & Corbet, lessees of the Virginia City mine, are stopping above the middle level on a splendid body of mineral. The pay streak varies from three inches to one foot in width. The first class mills 250 ounces per ton. A drift is being run from the lower level easterly for the purpose of cutting the main ore body, which is some 20 ft ahead.

REPUBLICAN MOUNTAIN.—The Corry City property is more than coming up to the expectations of its owners. The amount of rich ore now in sight in the mine is a sure guarantee of what will be found in this true fissure vein, as depth is gained from the surface. The property is meeting with such encouraging results that the work of development and exploration goes on uninterrupted. The ore body in this mine has been thus far continuous. The new hoisting works at the mouth of the main tunnel are well under way. A force of miners is busily engaged removing the debris from the shaft, preparatory to sinking. The first-class ore ranges from 190 to 300 ounces silver per ton, while the second-class mills from 70 to 90 ounces.

NOTES.—*Georgetown Courier*, March 2: Haggart & Co., in the Buchanan tunnel, on Leavenworth mountain, have a good streak of ore 5 inches in width, which runs 900 ozs. first-class and 350 ozs. second-class, silver per ton. Work will be commenced on the tramway between the Pay Rock mine and mill sometime during the first portion of March. It will be the intention to complete it as soon as possible. Three runs of ore from the Mendota mine last week (Shay & Co's lease) aggregating 26 tons, 1,079 pounds net, returned a total value for silver and lead of \$5,062, being an average of \$190 per ton. Messrs. Pulsifer and Bruce, lessees on No. 5 lode of the Lebanon, had a mill-run, last week, upon 2½ tons of ore, which returned 184 ozs. silver per ton all in one class. The lessees of the Corry City mine will either build a mill soon, or will rent one of Georgetown's idle ones. Major Fulton, who went East a few months ago, is expected to return shortly. His trip east was for the purpose of raising capital to erect concentrating works and develop the mine. Last week was one of the worst weeks this year for doing mining work anywhere, and especially upon Democrat and McClellan mountains. The snow fell in large quantities, and the wind was severe, while the cold during the first part of the week was indeed intense. The water outlets to the tunnels froze up, causing the water to back up to quite a depth within. The snow drifted into the mouths of the tunnels, and it was almost an impossibility for the miners to work. A very small amount of work was done during the week, except to keep the tunnels clear from snow and ice. The miners confined themselves to their cabins, and were kept busy in procuring wood and keeping themselves cosy. It took no little exertion to protect themselves from the piercing wintry blasts that moaned around their cabins, and crept through the crevices in their log structures. They were more content to sit by the fireside than to face the cold and the storm which blew in a thousand white flakes at every opening of a cabin door.

IDAHO.

BAYHORSE.—*Ketchum Keystone*, Feb. 28: Ore and bullion shipments to and from Bayhorse are temporarily suspended on account of the snow. The smelters there have been inoperative since January 17th, but they will start up on March 1st on Ramshorn, Cinnabar, Elkhorn and Noonday ores. The Ramshorn ores require a considerable admixture of lead ore, and this has until recently been chiefly procured by pack-train from the Cinnabar mine on Squaw creek. Since the opening of the Trail creek road leading from Ketchum, regular shipments have been made from the Elkhorn and Noonday mines at this place, by fast freight. The smelters are now but scantily supplied with lead, but the efforts being made to open the Trail creek thoroughfare will undoubtedly be successful before the smelters run out. It is probable that the Ketchum mines will then continue shipments until such time as our own smelting industry is again put in operation.

VIENNA ITEMS.—Another big strike is reported in the Mountain King, consisting of six ft of 100-oz. ore. The Lion mine, the main working tunnel of which is but 200 ft from the Vienna mine tunnel, is supposed to be the same vein and is now developing rich ore bodies. The Solace Co. are working a small force on the Solace mine. It is current that said company, the head man of which is the well-known J. B. Haggin, will put up large reduction works there in the spring. The mines now in operation at Vienna are the Vienna, Mountain King, Solace, Nellie, Elsie and Emma. Provisions are scarce, but the stage company is making every effort to break the roads and will probably put on a fast freight line in a few days. Snow at Vienna is no deeper than on Wood river. There are 75 men in the Vienna mine, 30 in the Mountain King, 15 in the Solace, and 6 in the Lion. The wood choppers for the Vienna Co. have been put to work in the mines. Tom Tague is still hauling ore from the mines to the mill.

SALE OF THE MINNIE MOORE.—*Ketchum Keystone*: The famous Minnie Moore mine, located one mile west of Bellevue, was transferred Monday to Palmer, Bro. and associates, a close corporation of London, for \$500,000. The sale was made by the

owners, Messrs. Miller, Myers, Chaugnaux and Moore, through the agency of Dr. Welch, of New York city. The Minnie Moore mine is located in Galena gulch about one-half mile west of the town of Broadford. It has figured for the past three years as one of the most valuable galena mines in the Wood river country. The mine is excellently situated for extensive operation, and ore has already been developed for a distance of 500 ft. The galena lies in large bodies, and will average in value about 130 ozs. per ton.

THE SMELTERS OUTPUT.—*Ketchum Keystone*, Feb. 26: Figures showing the output of the Philadelphia smelters have from time to time been published in the *Keystone*, and in December an approximate of the year's yield was given. Official reports having since been completed we are now enabled to give the following: The total amount of all ores received at the Philadelphia smelters at Ketchum in the year 1883, was according to official data 15,054,000 pounds, of which 4,760,000 came from the sampling works of Conkling & Moulton, at Hailey, and the balance from mines tributary to this point. The total amount smelted in the same time was 14,854,000 pounds, leaving the balance of crude ore on hand 200,000 pounds. The ore received at the smelters came from 80 different mines, chief among which are the Irwin, Ontario, Elkhorn, Noonday, Davitt, Mayflower, Wolfstone, and the mines of Bulfinch. A large number of prospects shipped ore in 1883 for the first time, and the number in total contributing to the works was more than three times as great as that of 1882. The works closed operations Jan. 3d.

THE MINNIE MOORE.—*Woodland Times*, Feb. 26: A report that seems to be well authenticated comes from Bellevue to the effect that the Minnie Moore, Queen of the Hills and Monday mines have been sold to a party of Scotch capitalists for \$500,000. The sum of \$10,000 was paid down about a month ago, and \$50,000 more were put up during the past 10 days. The parties who negotiated the sale were formerly connected with the Horn Silver mine, of Utah.

MONTANA.

THE ANACONDA.—*Inter-Mountain*, March 1: R. C. Chambers, Supt. of the famous Ontario mine in Utah, and who recently visited the Anaconda while in Butte, says he does not scruple to class the Anaconda as the most wonderful mine he has ever seen. On the sixth level there are seven square sets abreast, 42 ft thickness of vein and no waste. This strength of vein continues, lineally, 1,400 ft or more. It is the same or better on the seventh and eighth levels. May be one ton in ten of this great ore body is first-class, worth, gross, \$80 to \$100. They shipped to England 1,700 tons of this last month in twenty days, and expect to send off 2,500 tons a month in the future. Mr. Chambers thinks there are 200,000 tons of second and third-class ore on the dump, which will average more than 20 per cent in copper.

NEW MEXICO.

SMELTER.—*Rio Grande Republican*, Feb. 26: The Organ smelter is evidently under a cloud. Attempts are still being made to run it, but as the result is not heralded forth it cannot yet be said to be successful. A rumor has reached here that Prof. Patrick is superseded, and that the man who has taken his place will tear down the machinery and re-erect it to suit himself. We all hope and pray that he may be successful; but hope has been so long deferred, that despair is beginning to take its place. Rudolph Ganz, of San Augustine, had an agreement with the Organ smelter people to keep them supplied with charcoal. With this understanding he went to work and made about 1,300 bushels of it, and then reported to the smelter that he was ready to bring it in to them by the wagon-load. The smelter folks told him to send in forty bushels as a starter! A madder man than Ganz it would be hard to find just now.

ORE.—*Las Vegas Gazette*, Feb. 26: Fifteen tons of ore shipped from the Eureka district about two weeks since, has returned upward of \$100 to the ton. The ore was from the Lucky and Jupiter mines, belonging respectively to J. W. Rowland and Murphy & Devine. The ore was reduced by the Billing Smelting Co. at Socorro. Mr. Rowland shipped a lot of ore to Benson a short time since, which returned him over 300 ounces to the ton. The mines referred to are in the Dug Out camp, some three miles from Eureka proper. Mr. Brennan, of Silver City, took \$50,000 out of 900 tons of tailings by running them over vanners. There is said to be more graphite in the Raton mountains, near Trinidad, and at the foot of the Spanish peaks, than in all the rest of the United States. The celebrated Solitaire mine, near Kingston, is at last in the hands of its original owners, the Wilson brothers. The bondsmen of Tabor & Wurtzschach, Crawford & Bradley, failed, and the Colorado men did not procure new sureties before 30 days of grace were up. The Wilson boys will commence work on the mine at once.

OREGON.

MINING NOTES.—*Jacksonville Times*, Feb. 26: More rain is wanted at once. Miners of Josephine county are busy. Klippel & Keaton, of Poorman's creek, and H. D. Russell, of Forest creek, are doing some piping. There is an abundance of water in the Galice creek district, and several miners are taking advantage of it. It is said that E. Canfield, who is prospecting for quartz in the Galice creek district, has discovered a good ledge. The snow in the mountains is melting fast, affording those whose ditches head there considerable water for the time being. There being an abundance of water, quite an area of ground has been washed off at the Cayote creek mines already. A clean-up is now being made. Some prospectors from Eugene City—Mr. Whitney, an old southern Oregon miner, among the number—are investigating the Jackson creek diggings. The miners in the Steamboat district have plenty of water since cold weather ceased, and we expect to hear good reports from there, as considerable mining is being done. A. P. Ankeny, D. P. Kennedy and Vincent Cook have incorporated themselves into the Bunkum Mining Co., to work extensive diggings not far from the Sterling mines. Walter Simmons is working his extensive mines at Galice creek, and has plenty of water for his giant.

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ASSESSMENTS.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECURITY.	OFFICE IN S. F.	MEETING.	DATE.
Anglo-Mexican M Co.	Mexico.	C A Morse	217 Sansome st.	Annual.	Mar 11
Chollar M Co.	Nevada.	W E Dean	309 Montgomery st.	Annual.	Mar 19
El Dorado M Co.	California.	J H Sayre	230 Pine st.	Annual.	Mar 10
Quintana Thimble Co.	Calif.	C E Elliott	309 Montgomery st.	Annual.	Mar 11
Laurel & Norcross M Co.	Nevada.	J F Lightner	309 Montgomery st.	Annual.	Mar 12
Delores Con M Co.	California.	E M Hall	308 Montgomery st.	Annual.	Mar 25
Potosi M Co.	Nevada.	W E Dean	309 Montgomery st.	Annual.	Mar 21
Sierra Nevada M Co.	Nevada.	J D Hirth	333 Pine st.	Annual.	Mar 11

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECURITY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D C Bates	309 Montgomery st.	25	Mar 12
Galver Con M Co.	California.	W Willis	309 Montgomery st.	40	Jun 23
Contention Con M Co.	Arizona.	D Bates	309 Montgomery st.	25	Jun 12
Perles Blue M Co.	California.	T Wetzel	322 Montgomery st.	10	Mar 15
Idaho M Co.	California.	D Bates		4.00	Dec 2
Jackson M Co.	California.	D C Bates	309 Montgomery st.	10	Jan 4
Kentuck M Co.	Nevada.	J W Pew	Pine st.	10	Feb 19
El Diablo M Co.	Nevada.	R W Heath	Pine st.	25	Nov 26
Standard Con M Co.	California.	W Willis	309 Montgomery st.	25	Nov 26
Standard Con M Co.	Arizona.	Nash	315 California st.	25	Dec 15
Grindstone M Co.	California.	Staufsch	419 California st.	10	Mar 11

LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Jonnina King M Co.	California.	D C Bates.	309 Montgomery st.	25	Nhr 12
Snilver Gun M Co.	California.	D C Willis.	309 Montgomery st.	10.	Jan 23
Contention Gun M Co.	Arizona.	D C Bates.	309 Montgomery st.	25	Jan 12
berbe Blue Gravel M Co.	California.	T Wetzel.	522 Montgomery st.	10.	Mar 15
Daniel M Co.	California.			100	Jan 2
California M Co.	California.			4	Jan 4
Kentuck M Co.	Nevada.	J W Pew.	Pine st.	10	Feb 19
It Diablo M Co.	Nevada.	R W Heath.	Pine st.	25	Nov 26
Standard Con M Co.	California.	Wm Willis.	309 Montgomery st.	25	Mar 12
Wynfield M Co.	Arizona.			10.	Mar 12
Wynfield M Co.	California.	Stauffer.	419 California st.	10.	Mar 12

San Francisco Metal Market.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING FEB. 14.	WEEK ENDING FEB. 21.	WEEK ENDING FEB. 28.	WEEK ENDING MARCH 6.
Alpha.....	1.70	1.20	.55	1.75
Alta.....	1.70	2.85	1.60	1.75
Andes.....	35	30	40
Argentine.....	10	10	.....
Atlas.....	10	.....	.....
Belcher.....	35	30	1.00
Belmont.....
Best Belcher.....	2.50	2.40	2.00
Billion.....	60	90
Bechtel.....	55	40	70
Belie Isle.....	35	35	40
Bell & Bell.....	11	9	10
Benton.....	20	25	20
Belle Tunnel.....	20	25	15
Calcuttania.....	20	25	20
California.....	20	25	20
Chambers.....	25	20
Chandler.....	2.05	2.15	2.95
Confidence.....	1.00	1.10	1.50
Con. Imperial.....
Con. Virginia.....	20	30	25
Crown Point.....	90	100	1.20
Day.....	1.90	2.30	2.15	2.05
Elko Con.....
Eureka Con.....	1.25	1.70	1.25	2.00
Excelsior Tunnel.....
Exchequer.....	35	45	30
Grand Prize.....	15	20	15
Gold & Curry.....	1.60	1.80	1.50	2.05
Golden North.....	30	35	2.40
Holmes.....	2.10	1.50	1.25
Independence.....	35	50	30
Julia.....	25	25
Kentucky.....	20	25
Kentuck.....	1.75	.....
Martin White.....	50	70	80
Monro.....	20	25	1.50
Mexican.....	2.30	2.45	2.00	2.00
Mt. Diablo.....	2.00	2.50
Mt. Potosi.....
Noonday.....
Northern.....
Northern Noonday.....
Navajo.....	2.20	3.50	2.70	2.05
North Belle Isle.....	30	52	25
Occidental.....
Ocean.....	1.50	1.40	1.90
Overman.....	30	35
Oro.....
Potosi.....	45	65	1.15
Quincy.....	45	70	65
Seg. Belcher.....
Santa Nevada.....	2.20	2.45	2.15	3.60
Silver.....	10	3.80
Silver King.....	6.00	.....	6.00
Scorpion.....	25	40	40
Tasacora.....
Union Con.....	2.55	2.85	1.80	3.25
Ward.....	1.85	2.10	1.85	2.10
Wales.....
Yellow Jacket.....	2.40	2.50	2.10	2.70

Sales at San Francisco Stock Exchange

Bullion Shipments.

SALES AT SAN FRANCISCO STEAM EXCHANGE

FRIDAY, M. Mar. 6		SATURDAY SESSION	
550 Alva	1.00	290 Alta	1.00
400 Balver	1.90	100 Argentina	.050
100 R. & Belcher	2.20	300 Andes	.400
550 Badie Con.	100.00	300 Belle Isle	.200
100 Benton Con.	.100	550 R. & Belcher	.200
400 B. & C.	1.50	100 B. & C.	.100
400 Cal. Pacific	.400	100 Confidence	1.25
100 Eureka Con.	.350	200 California	20.25
300 Gould & Curry	1.55	115 Eureka Con.	3.00
120 Hale & Nor.	2.10	325 Gould & Curry	1.90
550 Harb. & C.	1.50	100 Harb. & C.	1.00
300 Mono	1.55	125 Mexican	2.65
250 M. White	.50	400 Mono	1.55
210 Navajo	2.40	450 Ophir	1.75
300 Ophir	1.10	100 Ophir	1.00
150 P.	.10	300 Sierra Nevada	3.10
300 Sierra Nevada	3.10	50 Savage	.80
800 Savage	.50	200 Syndicate	.60
100 Seg. Belcher	.15	250 Silver King	6.00
490 Union Con.	2.25	100 Utah	2.50
20 Yellow Jacket	.20	580 Yellow Jacket	2.40

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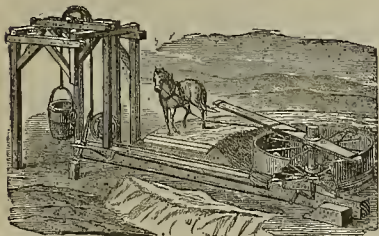
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Ingersoll, E, 3 1/2", medium ports.....	1,601 " "
National, improved, 3 1/2".....	1,250 " "
Rand, improved, 3 1/2".....	1,041 " "
Ingersoll, D2 3", beat Rand 3 1/2".....	744 " "
Ingersoll, D2 3", beat National 3 1/2".....	506 " "
Ingersoll, E 3 1/2", beat Rand 3 1/2".....	500 " "
Ingersoll, E 3 1/2", beat National 3 1/2".....	321 " "
National beat Rand.....	139 " "

[ESTABLISHED 1864.]

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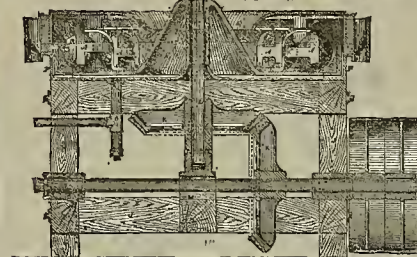
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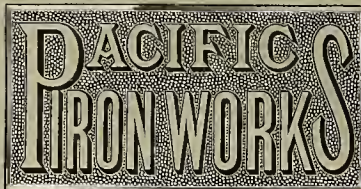
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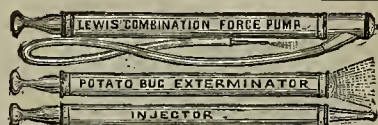
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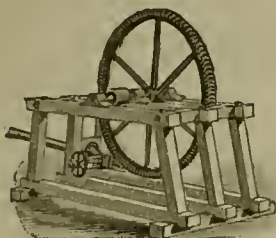
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The New Mines.

For several years we have not had so much of an old-fashioned "mining excitement" as that now prevailing concerning the Cœur d'Alene mines in Idaho. Interest in these mines is wide spread and thousands are going. It is true that there have been very highly exaggerated stories disseminated; that the country has not been prospected sufficiently to warrant the furor; that it is cold and rough; an expensive region to get to and to live in; that provisions are high, and that there will be ten or twenty even to one claim. All these things are known, yet men will go in spite of them.

We have for some months collected all reasonable information concerning these mines—for and against—and published it from week to week. It is within our experience that advice to men on subjects of this kind is hardly appreciated. The individual probably knows his own business best. For men to give up good claims or good positions to rush off after new gold fields is of course folly; but men will do it. Old prospectors and miners will go if they can possibly do so. We have deemed it our duty, therefore, instead of giving any lectures on the topic of mining excitements, to give what information we could gather for the benefit of those who were looking for it.

On page 178 of this number of the PRESS is a large map, which shows the railroad routes on this coast, and the location of the new mines. By means of this any one in any camp on the coast can see the route he must travel to get to the new mines. The position of the Cœur d'Alene mountains with relation to the line of railroads is also shown. The map is useful as a means of general reference to the railroads of this coast, and the geographical boundaries and positions.

Many conflicting accounts of the new mines come to hand. For instance, three men write to a Portland (Oregon) paper, and sign their names, A. Sunderland, S. Serlye and Matt White, to the following:

"In answer to our many friends we will answer through your columns, giving the facts in regard to the mines as they appear to us or any other men not interested in a whisky mill or some other traffic along the road to catch the honest miners who have been lied to by the traders who fixed for them last fall and have been lying ever since to get a big crowd to come so they can make a few dollars off the travel, which they are doing in good shape.

Without exception it is the most outrageous excitement that has been for many a year, and is bound to ruin many a man. Gentlemen, take our advice and stay away from the mines. If you go in any town or station along the road and express an opinion that you intend to write to the papers and stop your friends from coming they will almost jump you for a fight in a minute. These are facts, and we do not ask any one to take our advice, but come along and see, and if we have not told the truth they can call us a set of liars. But there are hundreds in the mines to-day that express themselves as we do. We do not offer advice to any one except our friends, and to them we say stay at home, and do not be foolish, as we were, to believe every lie you see, because there are nine lies to one truth in regard to the Cœur d'Alene mines."

As to the side gulches, they can be worked a little earlier than the main creeks, but from present prospects these gulches will not average more than \$3.50 to \$4 per day to the man for the year. We have a good many men here that will tell that they make from \$25 to \$40 per day, but when you want them to show you their "prospect," then it looks very slim.

As I stated in a former letter, I have made no locations. As yet I have not seen anything worth while. Unless the quartz shall redeem the camp, I think it will be quite slim here. I would advise no one to come here that is now working.

This seems to be an extensive mineral region, and well enough to prospect in, but it will take time and money to explore it. As regards business, I think the place will be good for a few months in the spring, and as long as the rush lasts—that is with the money brought in, not with the gold taken out of the mines. I am of the opinion that for mining it will be as good a year from this spring, and certainly much safer than now.

John Willman writes to Mr. W. Watkins of Virginia, Nevada, giving his news of the mines. Mr. Willman was night foreman of the Consolidated Virginia pan-mill all the time it was running, and was in the employ of Mackey & Fair ten or twelve years. He left November 13, 1883, and on the 26th of the month reached the mines, where he has ever since remained. The *Enterprise* says he is a good, square, reliable, steady-going German.

I have just returned from a prospecting trip to the north of the Cœur d'Alene river. We found no prospects to justify making locations. As I said in a previous letter, the camp is over-

estimated. This is brought about by the newspapers and men who want to sell out. The railroad organ puffs the mines, and it is the railroad that is making the money.

There is no work being done on the mines; no drains are being run, and no preparations making for spring work. The owners of claims are nearly all on the sell and for very light prices. It will be the first of July before there can be anything done in the main creek, and then they will be in the same situation as last summer, only able to work the rim rock. On the bed of the creek, where bedrock is reached, in my opinion it will not pay more than \$8 per day in any claim on the creek, for working days. As they are only able to work from four to five months in the year, they will not be able to save much money—many of them will not make salt. When it comes to moving so much heavy timber and also strip from five to ten feet of top gravel—handling it three times—it will require a great deal of hard labor.

A correspondent of the *Butte Miner*, in a long letter, says of the Trout Creek trail: The first twenty miles was made in good shape, the trail being in excellent condition and leading up Trout creek on a very gradual ascent. We camped the first night at King Emerson's, who keeps a sort of public inn at the foot of the mountain. Here trouble began. For the first time since we started did we feel in the least fatigued. Those who tell you that it is a small matter to walk over the summit, either know not what they are talking about or have some motive for lying. From King Emerson's till the foot of the mountain on Eagle creek is reached, a distance of about twelve miles, it is "perfectly awful." Of course it is a mere snow trail, and, being looked out and prepared hastily by Messrs. Tone and Hamilton, it is not expected that the best and most even route has as yet been selected. The boys hugged the backbone of the mountain, regardless of elevation or anything else. From where the trail reaches Eagle creek it is about three miles over a level bottom to Eagle City. The whole distance is claimed to be 34 miles, yet in one's imagination it is a long hundred by the time you reach your destination. We made the trip across the trail, however, within two days. It has been made by good walkers inside of 12 hours. The trail is constantly lined with men coming in or going out. We must have seen over a hundred, pulling their grub and bedding on toboggans, to say nothing of as many more carrying their baggage, or having it drawn by dogs on *trais*.

I have looked up and down the creeks for miles, and everywhere find the ground covered with claim notices. There seems to be little chance now for an outsider to "catch on" unless he has a well filled purse. The only claim that has been worked is the "Widow's." I paid a visit to that mine yesterday, but saw nothing but a pile of sluice boxes and the piles of rocks that had been taken out of the small piece of ground worked. The snow covered most everything, and no work was being done.

Separation of Nickel from Cobalt.

EDITORS PRESS:—I have succeeded after many trials in effecting a very good separation of the above named metals by means of potassium zanthate. The difficulty arose from the solubility of the zanthates of both metals in the same solvents under ordinary conditions. The statement of a correspondent of the PRESS some years since, that the cobalt zanthate was insoluble in ammonia was incorrect. My method has enabled me to detect cobalt in the metallic nickel sold by the dealers in (impure) chemicals, which is not bad for a rapid process designed only for the assay office.

I hope soon to perfect a simple method of isolating the two metals from the other constituents of an ore, and finally to make the assay of these troublesome metals almost as easy as that of copper. I reserve particulars until I have finished my experiments. I think I have found a way in which to preserve the potassium zanthate solution indefinitely. I have some which is over a month old, and it is as good as ever.

C. H. AARON.

Prescott, Arizona, March 2d, 1884.

SUTRO TUNNEL COMPANY.—At the annual meeting of the Suto Tunnel Company, on Monday last, the following officers were elected for the ensuing year: President, Charles W. Brush; Vice President, William Johns; Treasurer, London, Paris and American Bank (limited); Secretary, Pelham W. Ames; General Superintendent, C. C. Thomas; Trustees—F. F. Low, William Johns, Thomas P. Stouey, David Cohn, Hugh Marshall, Charles W. Brush and Pelham W. Ames. The Secretary's report shows the total receipt for the year past were \$107,776.07. The balance on hand, after paying expenses, was \$1,502.14. Of the receipts, \$71,515.75 was from royalties, the Crown Point Company having paid \$25,940.25, and the Andes, \$123.75. Fourteen other mines contributed to the receipts by royalties.

A MINE owner who took an expert to his claim that he might take notes in case his testimony would be needed in future litigation, was asked which way he thought the ledge ran. The expert paused a moment, and then replied: "First show me the direction of your side lines. How the dence can I trace a ledge in a case like this until I see your side lines?"—*Georgetown Courier*.

Extra Session of the California Legislature.

Gov. Stoneman has shown a large degree of firmness under trying circumstances in issuing the following call. It is a matter of great moment to all our people, and we insert the remarkable document which speaks so loudly for itself:

STATE OF CALIFORNIA,
EXECUTIVE DEPARTMENT.)

To the People of the State of California: For four years the chief railroad companies of this State have refused to obey the laws imposing taxes upon their property. Legal actions instituted against them to enforce collection, after having been under various pretexts delayed, have lately been terminated by proceedings through which it was practically established that while nothing was legally collectable from these corporations, yet the State was willing to accept whatever they in their discretion saw fit to accord.

The humiliating attitude in which the State of California is thus placed must fill the heart of every public-spirited citizen with regret and mortification, whilst the disturbance of our whole financial system, caused by the repeated and persistent delinquency of the companies, no wise man should willingly permit to continue. More stringent and effective measures for the collection of revenues from railroads are imperatively demanded. The present condition of affairs also demands a change with reference to the regulation of the business of transportation companies.

The system of electing Railroad Commissioners from districts has not given satisfaction. A widespread discontent exists, engendered by a delay in adjusting a tariff of freights and fares. If the results so long hoped for from a Railroad Commission are ever to be attained, it must be through a revision of the constitution and laws on this subject.

Now, therefore, an extraordinary occasion having arisen, I, George Stoneman, Governor of the State of California, by virtue of the power in me vested by the constitution of the State, do hereby convene the Legislature to meet and assemble at the State Capitol on the 24th day of March, A. D. 1884, at 12 o'clock m. of that day; and do hereby specify the following subjects upon which it is assembled to legislate:

First—To propose and submit to the people of the State of California an amendment to section 4 and to section 10 of Article XIII of the constitution of the State.

Second—To propose and submit to the people of the State of California an amendment to section 22 of Article XII of the constitution of the State.

Third—To propose and submit to the people of the State of California an amendment to the constitution of the State by which the Railroad Commission as now existing shall be abolished, and in lieu thereof a Railroad Commission, to be composed of three commissioners, shall be created; said commissioners to be appointed in such manner as may be provided by law from the time of the adoption of said amendment until the next general election, and then to be elected at said election from the State at large; and to prescribe the term of office, duties, authorities and powers of said commission.

Fourth—To enact all laws necessary for the assessment to and collection from all railroad corporations or companies, doing business in this State, of income taxes.

Fifth—To amend or repeal any or all existing laws relating to revenue, and to enact new laws relating to the same.

Sixth—To propose and submit to the people of the State of California an amendment to the constitution of the State to the end that all property belonging to railroad corporations may and shall be assessed by the State Board of Equalization in the same manner as property belonging to individuals is now assessed by local assessors; and that mortgages and deeds of trust, contracts and other obligations by which a debt is secured, covering the property of railroad corporations, shall, for the purpose of assessment and taxation, be deemed and treated as an interest in the property affected thereby.

Seventh—To enact laws providing that the property of railroad corporations or companies may and shall be sold for payment of delinquent taxes in the same manner as the property of private persons is sold under the same circumstances.

Eighth—To enact laws providing that no writ for the prevention of the collection of any revenue, or to hinder or delay the collection of the same, or to prevent or interfere with the sale of property for delinquent taxes, shall in anywise issue, either injunction, prohibition or any other writ or process whatever; but that in all cases in which, for any reason, any person shall claim that any tax paid by him was illegally or wrongfully levied or collected, he may recover the same by action.

Ninth—To enact laws providing that whenever property is sold for delinquent taxes, a receiver may, upon application of the purchaser, whether said purchaser be a private person or the State, be appointed by any competent court to take charge of the same from the day of the execution of the certificate of sale.

Tenth—To enact a law declaring that the people of the State of California have not authorized and do not ratify any compromise nor any judgment heretofore rendered by consent in any action or proceeding for the collection of

revenue by which a less amount is or has been received or recovered than the sum due by law or claimed in the complaint in the action in which said judgment was rendered for the tax, interest and penalty, and providing means for setting aside said compromises and judgments; and to enact laws more clearly defining the powers and duties of the Attorney-General, District Attorneys and Boards of Supervisors with reference to the collection of delinquent taxes.

Eleventh—To propose and submit to the people of the State of California an amendment to the constitution fixing a maximum rate of charges for the transportation of passengers and freight on all railroad lines in the State, and for that purpose to classify railroad lines according to length, gauge or income.

Twelfth—To enact laws for the prevention of and punishment for discrimination, and for the reform of abuses in railroad transportation.

In witness whereof, I have hereunto set my hand and caused the great seal of State to be affixed, at office in the city of Sacramento, this fifth day of March, A. D. 1884.

[SEAL.]

GEORGE STONEMAN,
Governor.

Attest: THOS. L. THOMPSON,
Secretary of State.

Aluminum.

Soon after Deville succeeded, more than twenty-five years ago, in obtaining aluminum on the large scale from its chloride by the use of sodium, on the principle introduced by Wohler, various methods were suggested for obtaining the metal by substituting other reducing agents for sodium, and by means of electrolysis. These attempts were scattered through the years 1856, 1857, and 1858. Since then, excepting an occasional effort in the direction of electroplating, the industry, if it may be called so, has remained substantially as Deville's experiments left it. The other processes have not been practically successful, and the inherent cost of the sodium method appears to have been a serious obstacle to the use of aluminum in the arts.

Some revival of interest in the production of this metal has recently arisen in England, where it is stated a process has been invented by which aluminum can be produced so cheaply as to make practicable its speedy application to the purposes for which its properties peculiarly adapt it. The descriptions of this process, unfortunately, as given in the journals, do not warrant such an inference. According to these accounts, it consists in obtaining alumina from alum or hauxite, then converting the alumina into aluminum chloride, and finally reducing the metal by sodium. The steps of the process, if the description given in the papers is correct, are substantially identical with those described by Deville in his book, "De l'Aluminium," Paris, 1858, and the expensive sodium is the reducing agent.

The retail price of aluminum is reported at \$1.25 per troy ounce. The quantity of the metal sold in this country in 1882 was inconsiderable. Its use is confined to the manufacture of light weights, parts of mathematical instruments, and similar articles.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MEDICAL COMPOUND.—George Taylor, Redding, Cal. No. 294,288. Dated Feb. 26, 1884. This is a compound which is especially useful in the treatment of diseases, such as rheumatism, neuralgia, toothache and nervous complaints. The compound is vegetable in its nature.

SOFA BED.—Wm. A. Clark, S. F. No. 294,198. Dated Feb. 26, 1884. This invention relates to the class of sofa beds in which the ends or heads, which are fitted to the main body frame, are adapted to have an adjustment between a horizontal and vertical position, and intermediate inclination. The invention consists in the novel connection between the heads and body frame, whereby this adjustment is effected.

THE NEW YORK *Sun* says: "Now that the layers of tin ore in Harney Peak district of the Black Hills are practically inexhaustible, and black tin, which costs now from \$350 to \$400 a ton, can be produced at the new Dakota mines for less than \$40 per ton, and keeping in view that we import something like \$25,000,000 worth of tin every year, and that with the growth of the canning industry the consumption is constantly increasing, the importance of the discovery becomes self-evident."

THE FEBRUARY PAY-ROLLS.—At the Consolidated Virginia office yesterday, Secretary J. M. Taylor disbursed \$13,005.75 to the employees of the Consolidated Virginia, California and C. & C. shaft, and \$9,057 to the employees to the Union shaft. At the Ophir office Secretary W. S. Bender paid out \$26,596 to the employees of the Ophir, Mexican, Union Consolidated and Sierra Nevada, and Superintendent Lyman, at the Utah, distributed \$2,891.50 to the employees of that mine.—*Virginia Enterprise*.

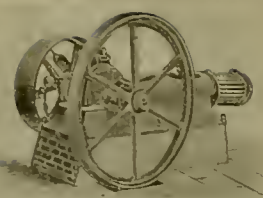
AMADOR claims to have in the Plymouth the heaviest gold producing mine in California,

TATUM & BOWEN,

25. 27. 29. 31 Main St.. near Market. San Francisco. and 187 Front St.. Portland. Oregon.

MANUFACTURERS OF

Sawmill Machinery, Engines and Boilers.



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BALL'S PATENT HIGH-SPEED ENGINE,

Embodying a new, and the only correct, Governing Principle. Valve practically impervious to wear, and almost frictionless. No steam chest. For amount of power economically developed, it is, at the same time, the finest and cheapest Engine in the world. One can be seen running at our works.

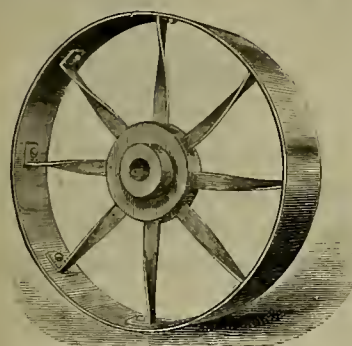
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PERKINS' SHINGLE MACHINERY,
OLEMATER STEAM PUMPS of any Capacity.
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WILLARD SMALL ENGINES and BOILERS. First-class and Cheap.

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ERICSSON and RIGER HOT AIR ENGINES.
R. HOE & CO.'S CHISEL TOOTH SAWS.
SIGHT DROP CYLINDER CUP.

WE ALSO CARRY IN STOCK:

Shive and Waters' Governors, Best Eastern Leather and Rubber Belt, Emery Wheels, Packing Waste, Etc.

MACBETH'S —PATENT— STEEL PULLEY.



Advantages of these Pulleys.

They are less than half the weight of cast-iron pulleys; are polished on the face; are made either crowned or straight, and are turned in the lathe the same as the best make of cast-iron pulleys.
They are carefully balanced. They are subject to no contraction strains, and can be run at very high speed without danger of bursting.
On account of their great lightness and the form of the arms, they absorb less power than any other pulley.
They are the only pulley of the kind which runs true. They cannot be broken in transport.

TESTIMONIAL:

MATHER LANE SPINNING CO. (Limited),
LEON, ENGLAND, NOV. 5, 1883.

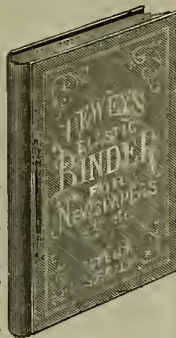
N. Macbeth, Esq. Dear Sir: The Patent Steel Pulleys supplied throughout to our No. 2 Mill are working to our entire satisfaction.

They are very true, and are about 50 per cent lighter than the cast-iron pulleys in our No. 1 mill.

Yours faithfully,
For the Mather Lane Spinning Co. (Limited),
[Signed] RICHARD T. MARSH,
Managing Director.

Risdon Iron & Locomotive Works,
Sole Manufacturers and Agents for the
Pacific Coast,
S. E. Cor. Beale & Howard Sts., San Francisco.
Send for Circular and Prices.

AN EASY BINDER.—Dewey's Patent Elastic Binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable, and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Record, Home Journal, Harper's Weekly and Scientific American, 85 cents; postage 10 cents. Postpaid to subscribers of this paper, 50 cents. Send for illustrated circular. Agents wanted.



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ENTIRELY RENOVATED & NEWLY FURNISHED.
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Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

ASSESSMENT NOTICE.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador county, near Drytown, California.

NOTICE is hereby given, that at a meeting of the Directors, held on the 30th day of January, 1884, an assessment (No. 44) of three (3 cts.) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 402 Front street, room 8, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 12th day of March, 1884, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 10th day of April, 1884, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

MARK T. ASHLEY, Secretary.

OFFICE—No. 402 Front Street, Room 8, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

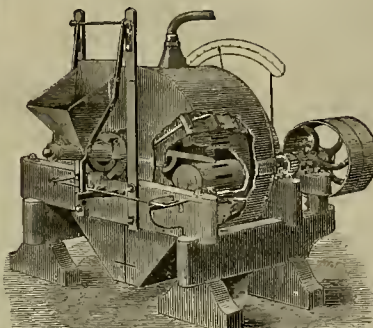
San Francisco, March 1, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 65, of twenty-five cents (25c.) per share, was declared, payable on WEDNESDAY, March 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.

OFFICE—Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

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WORKS ORE WET OR DRY.

Awarded SILVER MEDALS in 1882 and 1883
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GOLD MEDAL AWARDED

—AT—
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—FOR—
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Best Hoisting Engine and
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All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for flour and other mills. BOOK & WAGNER, 123 and 125 Beale St., S. F.

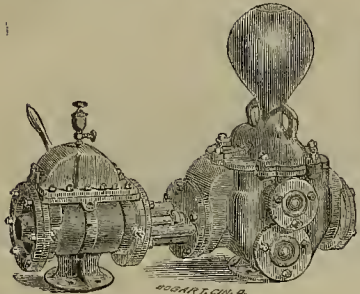
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Manufacture Iron Castings and Machinery
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Safety Catches for Elevators. All kinds of machinery
made and repaired. ORDERS SOLICITED.

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The undersigned are in receipt of regular supplies from Cardiff, Wales, and offer the COKE
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RISDON IRON AND LOCOMOTIVE WORKS,

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Economy in space and fuel. Safety at high
pressures. Freedom from scaling. Equally
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Especially adapted for mills, factories, hotels,
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Will work well with muddy water and any kind
of fuel.

TESTIMONIALS.

St. Louis, Mo., Sept. 23, 1883.

Messrs. Adolphus Mier & Co. GENTLEMEN:
We cheerfully certify that the "Heine Patent
Safety Boiler" put up by you in our establish-
ment has proved very satisfactory in its working.
The chief points of excellence in the "Heine
Safety Boiler" are its economy in fuel and space,
freedom from scaling, aptitude for power and
heating purposes, working equally well with clear
and muddy water. We warmly recommend it to
all using steam machinery. Yours truly,
ANHEUSER BUSCH BREWING ASS'N.

OFFICE OF SUP'T OF ROYAL RAILWAYS,
BERLIN, Sept. 23, 1883.

To Mr. H. Heine, Civil Engineer: In reply to
your inquiry of September 2d, we respectfully in-
form you that the three boilers built under your
patents, under steam since September 25, 1881, at the Alex-
ander Platz Depot, as well as the two at Friedrich Strasse
Depot, under steam since September 22, 1882, have given
good satisfaction, requiring no repairs whatsoever to date.
The internal cleaning of the boiler was always accomplished

with ease on account of the convenient arrangement of the
tube caps, the adhesion of scales being fully prevented
thereby, and the boilers kept in prime condition.

(Signed): BRAUCKE.

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C. L. FOUTS, SECRETARY

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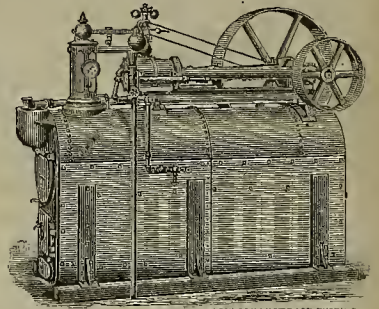
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GANG EDGERS, LIVE ROLLS,

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Skinner & Wood Celebrated Portable,
Mounted and Detached
Engines and Boilers,
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Unequalled for Simplicity, Safety and Effective Steam-
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THE CHEAPEST AND BEST

STEAM PUMP for Lifts from 10 to 70 ft.
FOR IRRIGATING PURPOSES

And all General Work where a Simple
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NO VALVES! NO PISTON!
NO OIL REQUIRED!

Can be Run by a Child.

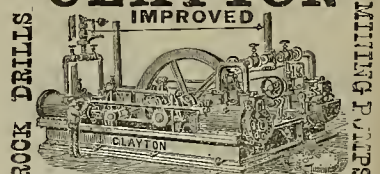
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PRICE—One-tenth of an ordinary Steam Pump, same
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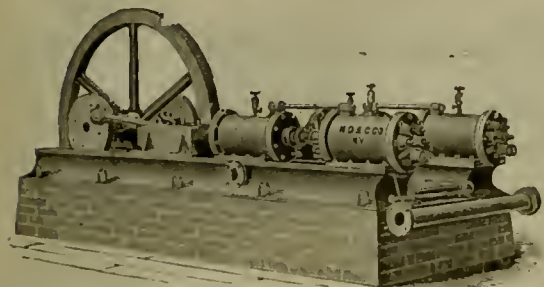
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A detailed illustration of a mechanical device, possibly a pump or engine component. It features a large, dark, teardrop-shaped flywheel on the left, connected to a central shaft. The shaft extends to the right, where it is connected to a complex assembly of gears and pistons. A long, thin rod or lever is positioned vertically above the central shaft. The entire device is mounted on a base with the text "WILLIAMS & PATON ENGINEERS" visible at the bottom.

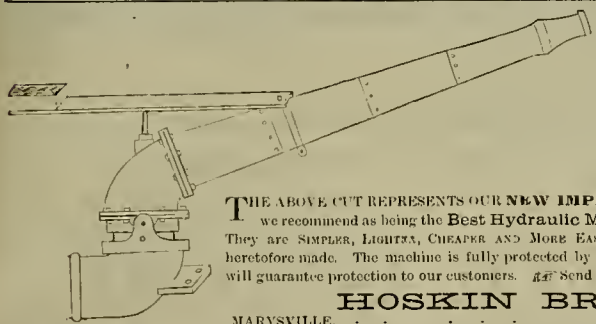
A detailed technical illustration of a steam-powered traction engine or portable engine. The machine is shown from a side profile, facing left. It features a large horizontal boiler mounted on four heavy-duty wheels. A tall smokestack is positioned at the front. The engine mechanism, including the cylinder, piston, and various connecting rods, is visible on top of the boiler. A large flywheel is prominent on the side. The entire unit is mounted on a sturdy metal frame. The illustration is a black and white engraving, typical of technical manuals from the late 19th century.

Ballard's Oak Tanned Loather
Belting.



— TO —

MARYSVILLE, CALIFORNIA.

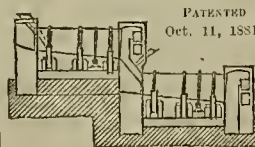


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machinery and all kind of models, tin, copper and brasswork.

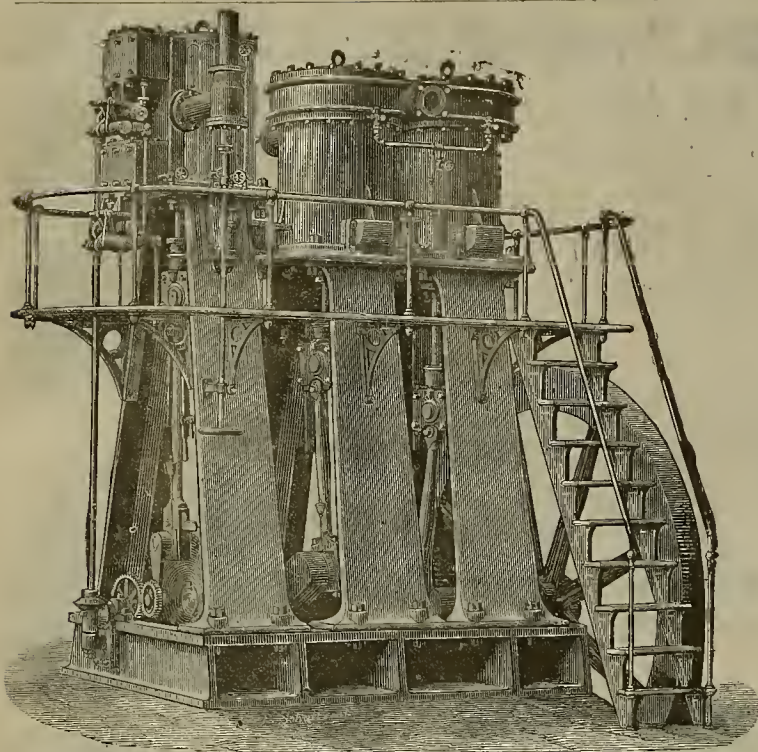
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E. G. DENNISTON, Proprietor.



MORRIS & VARNEY, General Dealers in Iron, Steel, Etc.,
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Working up to 93 per cent. of Fire Assay, using 25 per cen. less salt since July, 1882. **AS LICENSES FOR USE FOR SALE, or FURNACES CONSTRUCTED.** Address **R. A. NEVIN, Patentee,** ELVA IRON WORKS, 217 Fremont St., San Francisco, Cal.



With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

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AIR COMPRESSOR.

SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

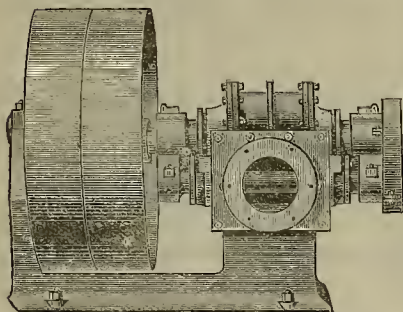
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WILBRAHAM
Rotary Piston Pumps,



The best pump in the United States for irrigating purposes, and will do an equal amount of work with one-third the power of any other pump.

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OF ALL MAKES.

MINING
PUMPS,

Quartz and Sawmill Machinery.

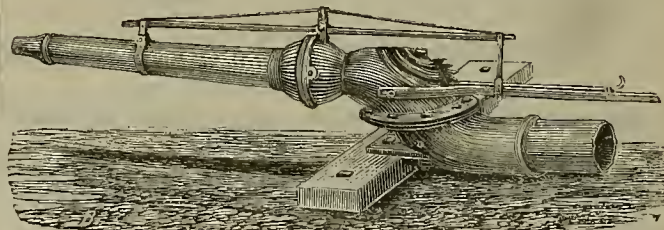
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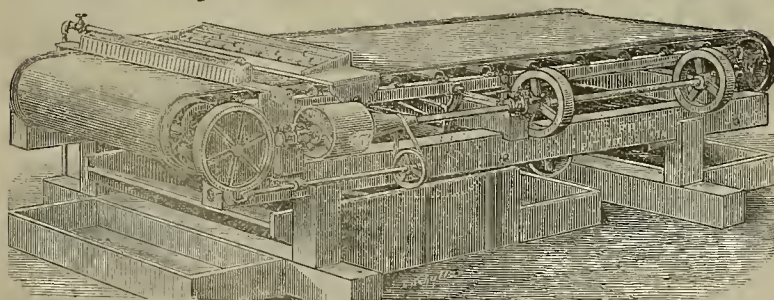
HYDRAULIC MINING MACHINERY

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\$1,000 CHALLENGE!

PRICE REDUCED,

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(\$575.00).



THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.

OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal.

A machine can be seen in working order and ready to make tests at the office of Hurdley, Spiers & Hayes, No. 220 Fremont Street, San Francisco.

To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.

Room 7—No. 109 California Street,
January 3, 1884.

SAN FRANCISCO, CAL.

New Book on Assaying Gold & Silver Ores.

By C. H. AARON.

For Practical Workers.—\$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent.

He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

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Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals;

Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & CO., Publishers, No. 232 Market street, San Francisco.

N. B.—This is Part I of three volumes on assaying by the same author. To be followed by Part II—Gold and Silver; Part III—Lead, Copper, Tin, Mercury. A majority of the best mining publications yet printed have been issued by and are for sale by DEWEY & CO., publishers of the MINING AND SCIENTIFIC PRESS, S. F.

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Snow Slides.

During the recent storms prevailing in the mountainous regions several snow-slides have occurred which have occasioned loss of life. This has mainly occurred among the mining population who live at high altitudes. In this State several snow-slides have occurred which have destroyed property, but no life. In Utah they have had a bad one in a locality famous for such disasters. On Friday night, the 7th inst., at 6:30 o'clock, a snow-slide half a mile long, extending from Summit down to Alta, swept away the works of the New Emma mine, killing Gus. Leyhecker, foreman; D. D. Wasson, machinist, and his brother; Samuel Prethero, Charles Colgreen and wife, Edward Croket, Lottie Meon, O. J. Johnson, N. S. Delano, Willard Stephenson and John Richardson. It was the worst slide ever known in Little Cottonwood, the snow piling forty feet high. The damage to the mine is \$15,000. The storm is too bad to bring the bodies down. Several of the killed have families. All the bodies found prove to be horribly mangled, owing to the immense weight which fell on them. The entire shift of the Emma mine buried, had to tunnel thirty-five feet through the snow and ice to get out. None was hurt. It is now learned that all the victims were standing round the boiler previous to going into the tunnel to spend the night.

A dispatch from Denver, Colorado, dated the 11th, says: At 6 o'clock yesterday evening a snow-slide descended on the little snow-bound station of Woodstock, on the Branch South Park railroad, 75 miles southwest of Leadville, carrying away every building in the town, including the railway station. Seventeen persons are known to have been caught, including Mrs. Doyle, a widow who kept the station, and her six children; another woman (name unknown) and ten section men. Two women were rescued last night alive, but seriously injured. The body of one section hand was recovered this morning. No others can escape alive. As soon as the news reached Pitkin the fire bells sounded the alarm, and a large number of citizens started on snow-shoes for the scene of the disaster. Among the missing are Jasper M. Carwell, of Tomish, J. Brown, telegraph operator at the station, George Alexander, Horace Alexander and Mike Shea. A large number of snow shovellers will leave in the morning.

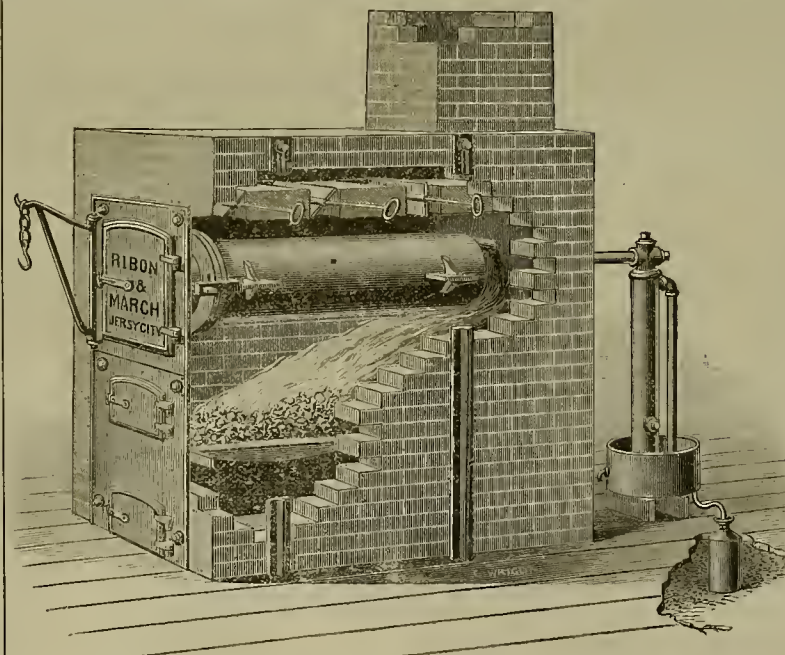
The snowfall in the mountain districts of Colorado the present winter is without parallel in the history of the State. Many mining camps in the west and south have been snow-bound since November. San Juan county is the greatest sufferer. Durango, Silverton and Rico, containing from 1,000 to 5,000 inhabitants, are still blockaded, no teams having reached either town for several weeks. Breckenridge, 50 miles north of Leadville, is nearly destitute. Montezuma, 10 miles distant, is in a pitiable condition. Gunnison, situated four miles from the largest coal mines in the State, is suffering from a coal famine. The snow is eight feet on a level over the whole country, and in ravines and gulches is from 50 to 100 feet deep. The only means of communication is by snow-shoes, and few men are heroic enough to brave the bitter storms. When the spring thaws move the mountain snows, fearful results must follow.

PEOPLE are leaving many of the mining camps of this State and Nevada for *Coeur d'Alene*.

Retorting Gold and Silver Amalgam.

The engraving on this page shows an improved form of retort and condenser for retorting gold and silver amalgam. Several sizes are made. The retorts are turned smooth inside, and are of a shape peculiarly adapted for rapid and complete work.

The cut represents a retort for gold or silver amalgam, where the capacity required exceeds 1,200 ounces. They make several sizes of this design, of capabilities from 150 to 1,200 pounds, troy weight, of amalgam when two-thirds full. They are made so that when the lower part becomes blistered or burned they can be turned over, ensuring a double life. These forms of retorts and condensers have been adopted from designs furnished the Joshua Hendy Machine Works, in this city, by Messrs. Ribon & March, of Jersey City, New Jersey. The condensers are built from new designs, and deliver the



IMPROVED RETORT AND CONDENSER FOR SILVER AMALGAM.

quicksilver, as is shown in the cut, directly into the flask without handling or loss. The engraving is self-explanatory.

BAD MINE WATER.—At the Osbiston shaft of the Gould & Curry mine, on the Comstock, a line of 2½ inch compressed air-pipe has been put in from the surface down to the Sutro tunnel level. The water eats the pipe out quite rapidly, owing to the great quantity of mineral matter it holds in solution. At the joint winze the water is very acid. It eats the tar off the ropes, and so corrodes them as to make it necessary to very frequently put in new ropes. A drop of the water falling on a piece of iron or steel at once produces a red stain. It is also very painful to the eyes of the miners, smarting intolerably and causing much inflammation.

At an extraordinary meeting of the Eberhardt & Aurora (White Pine) Company held in London, it was agreed upon that prospecting in the mine should be pushed with air drills, and \$100,000 should be raised for that purpose. The capital of the company is to be increased to £250,000 by the creation of 40,000 new shares.

A Drill Hole Cleaner.

Among the mining appliances recently devised is a piece of mechanism intended to facilitate the removal of sediment from the bottom of drill holes. It is a tube provided at its lower end with a series of sediment-receiving cups, and connected with an air compressor, so that when the tube is passed into the drill hole the compressed air or water issuing from the bottom of the tube forces the sediment upward, which sediment, when dropping back again, falls into the cups which can be emptied when the tube is withdrawn from the drill hole. The sediment cups are made adjustable on the tube, and the lower end of the tube is provided with apertures or recesses for the escape of the compressed air.

At the upper end of the tube, or rather connected with the upper end of the tube, is a small air-compressing cylinder. A flexible tube

connects this compressor with the tube reaching into the drill hole. The cups on the tube are funnel-shaped, and are arranged one above the other.

The operating tube is placed in the drill hole and the piston of the air compressor is worked. This compressed air escapes through the lower end or side openings of the tube, below the cups, and carries the sediment upward. The sediment falls back again and the greater part is caught in the cups. The tube is withdrawn and the cups emptied. This operation is repeated until all the sediment or pulverized rock is removed from the drill hole. The drill-hole cleaner is expected to operate as well under water as in a dry drill hole.

It is reported that the nickel mines in Cottonwood canyon, Nev., have been sold to an Eastern syndicate for \$125,000. The people of Lovelock hope the report is true, as the development of those mines will be of great benefit to that section.

THE flow of water from the Sutro Tunnel is \$,552,000 gallons per day.

Blasting in Coal.

In Europe one of the consequences of hard times among coal miners has been a reduction in the quantity of explosives per cubic yard of rock removed. It has long been evident that excessive quantities were employed, but it needed the irresistible influences of a narrow margin for profits to correct the fault which has existed ever since the adoption of stronger explosives than gunpowder. With regard to the use of compressed lime, to which we have before referred, experiments were recently made at Woolwich Arsenal, on behalf of the Royal Commission on Accidents in Mines, by Prof. Frederick Abel. During the experiments great care was taken to obtain, as nearly as possible, the same conditions as would exist in the case of a pent up charge where hardly any expansion can take place, so as to ascertain the highest possible temperature that could be produced. For this purpose there were provided heavy iron cases representing shot holes, 3 feet 6 inches deep. These holes were lined with wood, so as to intercept the heat, which might otherwise have been absorbed by the iron. The holes were then loaded with a full charge of compressed lime cartridges, and "tamped" (stemmed) similarly to a shot hole in coal. After pumping in the proper quantity of water, the maximum heat was ascertained in various parts of the charges by means of specially constructed thermometers, and by the introduction of various metals, the result being that in no case did the heat reach the melting point of lead. One of the inventors of the patented compressed lime cartridge states that steam attains a pressure, within three and a half minutes after the water has been added, of upwards of three tons to the square inch. He also states that the cartridges are prepared at the manufacturing of the company of an exactly uniform degree of causticity, and are, without inconvenience, preserved in an unaltered condition for any length of time, until the moment of charging the holes. Thus their efficiency is not altered in the least degree by the humidity of the atmosphere. An interesting proof of this was given a short time ago at the Shipley collieries, when, in the presence of several mining engineers, some shot holes were charged with cartridges made twelve months previously, and which had since been on a voyage to America and back, when they proved to be as quick and efficacious as others which had been made the same morning.

THE bulk of the travel on the N. P. bound for the *Coeur d'Alene* mines, is from the East to Belknap. The railroad hands say that Rathdrum is being so "boomed" in the East as to catch the trade and the travel. The wagon road from that place to Eagle City is being pushed ahead rapidly and will be completed in a few weeks. Wagons can carry fair loads in towards the mines as far as the road extends, and upon the completion of the thoroughfare a line of six-horse stages will make daily runs between the main N. P. track and Eagle City.

THE bullion product of some of the Comstock mines for the last quarter of 1883 was as follows: Andes, \$1,622; Belcher, \$46,326; Crown Point, \$157,931; Kentuck, \$86,801; Lady Bryan, \$1,800; Mount Christo, \$11,379; Ophir, \$32,977; Potosi, \$54,104; Savage, \$1,358; Union Con., \$5,065; Yellow Jacket, \$73,027; total, \$473,390.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eos.

The Harris Mines, Washoe.

[From our Traveling Correspondent.]

On the hills to the east of Washoe lake and Washoe valley, Nevada, some gold and silver ore was found in the early Washoe days, when the whole country was being searched to find ore that looked exactly like the Comstock ore. A district called Argentum was formed, the name since then having been changed to Washoe district. In 1860 to 1863 there was considerable excitement in this section, but at that time anything that failed to look like the Comstock ore was not worthy of much attention. Silver ores were desirable; silver mines were said never to fail or to be worked out; "gold seekers often died poor men." So after a small amount of surface scratching, many of these locators hastened off to some other excitement; and it so happened that this particular portion of Washoe district, where now is located the Harris gold mine and the Bessie Kirby silver mine, was almost entirely overlooked in that early prospecting. The Old Post, about half a mile away, was worked between '60 and '67, and tunneled about 900 feet. The Buckley Co. also did much work, running a tunnel over 800 feet, but by misdirection of their work they left the ledge pitching over them.

In 1882, Mr. Harris, a Gold Hill assayer, was out hunting jack rabbits, and happened while passing this old Washoe district to feel inclined to take a rest. While sitting, he saw a piece of float rock that glittered with gold and assayed \$26,000 per ton. Notwithstanding it looked so little like Comstock, he felt some slight anxiety to get another piece from the same ledge, and soon forgot his lost jack rabbits and centered his search for the hidden treasure, which resulted in finding in an incline shaft a small vein of fine specimen ore, a feeling broken off from the main ledge. On going below and running a tunnel, at 40 feet he struck a small ledge of silver rock, showing

Native Sheet and Wire Silver,

Some of the best samples assaying as high as \$1,700. Following the incline of this ledge down 36 feet, and then drifting on it under the mountain to cut the gold ledge found above 150 feet in that direction, east, in the silver lead, on reaching the point where the two ledges intersected each other at right angles, he found it all there changed to a gold lead, and showing good milling ore of the average value of \$200 per ton.

Since then he has run an incline from where it was struck in tunnel or lower drift from the incline, and while sinking the incline 70 feet, ran two crosscuts, one in the middle of incline and one at the bottom of it, the cut from the middle showing the better ore and a large body of it, considering its richness, four to sixteen inches, and worth \$3,000 per ton. This drift was filled up securely for the protection of the rich specimen ore there exposed. The bottom drift was also cutting the vein in good ore of lower average grade, from \$100 to \$3,000 per ton. There is not much specimen ore at this part of the ledge, as it is not yet into that strata containing the best specimen ores. It seems to be Mr. Harris' intention to explore his ground to prove something of the extent of his bonanza ore before erecting any reduction works. His expense money was easily produced by pounding up a few specimens in a hand mortar as needed.

A lad in Virginia City wishing to add to his Christmas funds, took about \$50 from a small specimen of this Harris ore. The present owners are E. W. Harris, D. Allen and J. C. Dunlap, the last owning each one-eighth part. The intersecting ledge of silver is called the Bessie Kirby, in honor of Dr. Kirby's daughter, of Virginia City, a little girl of eight summers, niece of Mr. Harris.

Marker & Smith hold the east extension of the Harris mine, and are drifting to strike the specimen ore, and were having encouraging prospects. The west extension is held by Joseph Douglass of Virginia City and B. F. Leet of Reno. Are sinking a shaft, and have erected a house and stable.

The Cowboy, higher on the hill, have a shaft down 70 ft.

The Washoe Giant is a strong out-cropping ledge of gold and silver, giving an assay of \$40 and upwards from the surface. They are running a tunnel to strike it below.

The old Buckeye, owned by Carsonites, was expecting to start up soon in earnest, as they have in their 700-ft. tunnel some good ore that was found in the early Washoe days, when it was opened, and 500 tons said to have been taken out. Five tons of surface float rock, taken last year, and worked at Gold Hill, gave a pulp assay of \$206 per ton.

There are in all about a dozen locations made in the close vicinity of the Harris mines, and with good encouragement for sanguine expectations.

About one and one-half miles to the north Messrs. Jackson & Milsap have a large ledge of 10 feet carrying silver and gold, and was also suspected strongly of being rich in nickel, but had not yet been assayed for that metal.

The Various Developments

Here almost give certainty that with the opening spring there will open up a nice little mining camp of Harrisville, at Washoe Lake, which is

about three miles from the mines and the nearest water, and near the railroad depot. Just across the valley are the old timber lands, stripped of the best lumber, but yet having abundance of wood and timber for milling and mining purposes. Virginia City can spare many dwellings, and some of her citizens may take advice and "go west." Washoe valley contains several fine ranches, and dairies are found to do well. Theodore Winters seems just in his element here raising horses and cattle, and a few hundred milch cows handled by Swiss dairymen under his direction for butter and cheese, which have a very quick sale at gilt-edge prices at Virginia City.

The famous Sandy Powers' mansion, now owned by a Reno capitalist, is rented out, and shows years of neglect, and leaves a strong impression that there was more money than brains when this monument was erected. Washoe Valley, though cold, is a healthy location, and some who have been there a long time think it preferable to the climate of California.

There are several families yet residing in Washoe who were there in 1860, and seem to enjoy most excellent health and have acquired a moderate fortune by farming there.

B. W. CROWELL.

The Cœur d'Alene Mines.

From an extended letter in the Butte (Montana) *Miner* we take the following statements concerning the new mines: Notwithstanding the "ravages of the elements," I lost no opportunity to gain what knowledge I could concerning the mines and their future. I will first treat of

Eagle Creek,

From its source to where it empties into Pritchard creek. But I would state before going further that Eagle creek is considered the main stream and that Pritchard joins it at Eagle City. This is certainly wrong, for Pritchard is a much larger and longer stream, and runs directly westward to the north fork of the Cœur d'Alene river, while Eagle is a short, small stream and runs nearly in a southerly direction to Eagle City, where it intersects Pritchard almost at right angles. Why the stream below Eagle City is called Eagle creek is one of the mysteries I am unable to solve. Eagle creek about three miles above Eagle City forks, the ground along the main stream and each fork for perhaps two miles all being taken up. Whether these locations will pay is a question, as they have never been prospected to any great extent. So it will be observed that it is all speculation as to the mines on this creek. I am inclined to the belief that there will never be found pay dirt on this creek. Possibly its north fork may turn out a few paying claims.

Now we will go to

Pritchard Creek,

Commencing at its source in the mountains, or as far as it is located, and trace it to its confluence with the north fork of the Cœur d'Alene river, distance about 20 miles. At, or near its head, we find a location of ten acres made by Johnnie Miller, formerly a hardware clerk of Butte, and at present the city recorder of Murrayville, and deputy district recorder under Judge Claggett. He, in common with many others, knows not whether his claim contains pay dirt or not, but of course feels hopeful. His ground has never been prospected, and from the fact that it lies in a mineral belt and no great distance from paying mines it is reasonable to conclude that his claim will pay out well. The same may be said of all the claims located below Johnnie's till Pat Flynn's is reached, some distance below. This claim is not open, but sufficient work has been done to demonstrate the fact that it will pay well. Mr. Flynn is recognized as one of the best miners in the camp, and is going about his work in a systematic manner. Between the first and fifteenth of March he will have 40 men at work sluicing off the snow and surface ground. Later he proposes to increase his force to about double the number.

The "Widow's Claim,"

Owned by Keeler & Co., comprising ten men, joins Mr. Flynn's below. This is the best developed mine on the creek; in fact, it is the only one that bears evidence of work. That it is rich, we presume there is no doubt. Mr. Keeler says they took out \$18,000 during their short run last fall, and operated it with a small force. He expects to work 75 or 100 men the coming season.

Mr. Murray's claim joins the "Widow's." His ground is not open, but we understand prospects well. Upon his claim is located the famous town of Murrayville, the rival of Eagle City. Below him comes the Ives' claim and several others, all unopened, when Bill Osborn's is reached. A town has also been laid out on this claim, and as the Evolution pack trail taps the creek at this point, it is thought the town, which is called Osborn, will loom up to huge proportions before the season is far advanced. Mr. Osborn already has a store and saloon, and quite a number of houses have been built. It is the prettiest site on the creek, and is rightly dubbed "Osborn Park." The claim upon which this town is situated shows up in good shape so far as prospected. A drain is being cut and other preparations are being made for vigorous operations as soon as the weather will permit. Bill Osborn is the prince of good fellows, and

your correspondent is not alone in wishing him the best of success.

From this claim down to Eagle City, and a distance of three and one-half miles below,

No Sign of Work

is visible. It is doubtful whether the owners of the ground know whether there is color in it or not. The Campbell claim, owned by Dr. Campbell, Frank Point and others, located at the point mentioned, three and one-half miles below Eagle City, has been worked to a considerable extent. This claim was bonded some time ago for \$3,000, but the parties failing to come to time the money put up was forfeited. Dr. Campbell has several ounces of dust taken out of the claim and says it pays handsomely—about \$30 a day to the man. Below him no claims are being worked. This exhausts Pritchard creek, the distance gone over being 17 miles. You can now judge of the prospects and what is being done in the main stream of the camp. It will be seen that aside from a few claims it is difficult to tell whether the ground will yield bountifully of the precious metal or not. There are quite a number of side gulches making into Pritchard creek that have been taken up, but their wealth is equally uncertain.

Beaver Creek,

A small stream running parallel with Pritchard, and which empties into the north fork of the Cœur d'Alene river a few miles below Pritchard, has been taken up by gold hunters, but it is not known that there is pay on the bedrock, so to speak. People in that country are wild, and lay claim to everything in sight. I have now gone all over the mining ground, and your readers can judge for themselves as to what it contains. One thing sure, I feel fully convinced after a careful survey of the field and the many conversations had with the best miners of the camp, that there is not sufficient in sight to warrant one-fourth the excitement there about the Cœur d'Alene mines. What the quartz will develop remains to be seen. I am rather inclined to believe that the quartz ledges are rich, and will prove the main stay of the camp.

It is Nonsense

To talk of 50,000 people going into the Cœur d'Alenes with the hope of doing business. Ten thousand men, including merchants, miners, teamsters and all other kinds of laborers, are sufficient to work all claims thus far taken up, within two years. And this estimate is based on the hypothesis that the ground claimed is all rich. It is reasonable to conclude, however, that 40,000 or 50,000 people will visit the Cœur d'Alenes between now and next summer. The gold taken out is of a coarse quality, and worth \$15 to the ounce. It is certainly beautiful, the mere sight of which being enough to cause the average old miner's eyes to dance with delight, and lure him on with a stout heart in search of new fields to conquer.

While I consider there is an unwarrantable excitement concerning this camp, I am impressed with the belief that the rush of old miners into the camp will not be unattended with good results, as it will serve to give that mountainous and heretofore isolated and unexplored country a thorough prospecting. It is evidently a gold-bearing country, and the overplus of population will have a chance to tax its energies in searching out the rich spots.

The Towns.

Concerning the towns located in the camp, a passing notice was made in my last. Eagle City and Murrayville, five miles apart, are struggling for the mastery, each having a plausible argument to put forth in its behalf. Eagle City claims to be more favorably located, and being the oldest town, hoots at the idea of being outstripped by any other. Property here is very high and still rising. Lots range from \$750 to \$3,000, and on entering the camp a stranger imagines himself on California street, San Francisco. Owing to the scarcity of lumber, comparatively few buildings of a substantial nature are going up. People seem willing to occupy tents or rudely constructed log houses for the present, hoping soon to be able to procure lumber with which to improve their lots. Two or three sawmills are now on the line of the railroad awaiting the completion of the road into the mines. They will be located a short distance above Murrayville, in the midst of as fine a belt of pine and cedar as one would wish to see in any country. Whip-sawed lumber is worth fifteen cents a foot, and scarce at that. Little can be done in the mines until the sawmills get in.

ORGANIZATION OF MINERS AND MINE OWNERS.—An organization, to be known as the "Glencoe Miner's Protective Association," having for its object the prosecution of the unlawful acquirement of valuable mineral lands under agricultural patents, has been formed at Glencoe, in this county. Sixteen names were enrolled at the first meeting. Mr. Walter C. Childs was elected President and Treasurer, and Mr. F. Cummings Secretary of the association. An ample fund has been provided, and every lawful means that money and labor can procure will be employed to protect the interests of mining at Glencoe.—*Calaveras Chronicle*.

CONCENTRATION.—A Wood River exchange, in speaking of the discontinuation of the \$20 freight rates on low-grade ores, speaks of the concentration of such ores as the next best means of making them profitable. The ores of Wood River will in a few instances admit of

profitable concentration, but the lowest-grade ores are often chiefly carbonates that cannot be concentrated to an advantage. Such ores carry a high per cent of lead, and will generally find sale at the smelters where such admixtures are required. It is not probable, however, that the U. P. Ry. will persist in discontinuing such rates as will induce large shipments so long as there is any profit to them in the transportation.

The Origin of Ore.

The following extracts are from a lecture by Prof. John A. Church, delivered to the pupils of the public schools in Tombstone, Arizona:

No one has ever seen ore in process of formation, but something has been learned of its formation and I will try and tell you how it is deposited in Tombstone. In the human frame there is a circulation of blood passing from the heart through the system and back to the heart. In plants there is a circulation of the sap; the earth has its circulation—water comes to it, passes through it and rises again to its surface in the form of springs. The first thing to be observed is the rainfall passing into the rocks. Rain penetrates more than twenty miles into the crust of the earth; it dissolves substances—ore as well as sugar. When we wish to extract the silver we add salt and blue-stone; every substance can be dissolved in the water, even the quartz; limestone is readily dissolved. Rain water in passing through the earth takes up minerals—lime, iron, potash, etc., which are deposited in the interior of the earth, and then return again in the form of springs. The rainfall is pure, but the springs are not pure, for they have taken up these mineral substances. Air also circulates in the earth; it takes up oxygen and nitrogen. When these combine with a solid rock the rock is said to be hydrated. This air is passed upward through the rocks as the water passes downward. These form springs.

In addition to water and gas, the earth has a circulation of solids; sea waves beat on the rocks and wear them away—where those particles are coarse we have pebbles; where smaller, we have coarse sand; smaller yet, mud, portions of limestone. Sea beaches are found in the mines of Tombstone.

When these particles are first worn off they are borne away—the finest particles borne far away and called shale. In the mines of Tombstone are found limestone, quartz and shale; which proves that where we now stand, on the hills of Tombstone, it was once deep water.

This history of a rocky sea cliff is the history of a whole world. The world was originally composed of gas, much heated and then cooled—like the volcanoes of the present day, where the top goes to the bottom and the bottom comes to the top.

No one has ever seen the original earth. It cooled gradually from a gas to a solid. In this way the chemist tries to obtain pure water: He takes water as pure as he can find it; heats it; then cools the steam and repeats the process until he gets a pure water. In this way quicksilver is purified, and camphor gum. So, a gas will condense into a solid, and a solid may be heated until it becomes a gas.

This earth was once a gas, heated and then cooled, until it became a solid. It is by these circulations of water and air that the ores are collected together and found in one place. If we were to see the original earth, unacted upon by the circulations which I have attempted to explain to you, we should find the quantity of metals in rock very, very small. At Comstock lode, Nevada, are found volcanic rocks which contain 55 per cent silver, and gold 45 per cent. So in the eruptive rocks of Leadville, Colorado, the proportions of gold and silver have been found to be similar. The geologists have been able to show how many tons of rock must have been dissolved to give this per cent of precious metal. The waters found holes, or crevices, where they could deposit the metals they had taken up, all of which are not deposited 3,300 feet or one mile below the surface of the earth, so that mining for these metals will not be carried any farther than one mile below the earth's surface, though the water penetrates 20 miles into the earth; the deeper the water goes the more the pressure, and when you increase the pressure you must increase the power of solution; releasing the pressure also releases the metals; the waters passing through the rock are forced now slowly, now more rapidly, and when such waters reach the crevices there is much less speed of the waters, and the metals are deposited there. In regard to the deposition of ores, scientists show us that the rocks have been acted upon again and again by water, and in this way the ore is collected. It is difficult to distinguish the age of the rocks, but they have shown where the first concentration of the metals in the oldest rocks known gave a yield of only one-half cent to the ton. The part of the circulation which collects metals is called the function of the circulation.

No one knows why the precious metals are deposited in veins, or in beds; but one thing can be shown—that where these ores are found there are eruptive rocks. In the western part of our country this is especially true.

Where not only shales but dykes are found—where melted rock has been forced to the surface, but by the action of water has been carried beneath the surface, which shows eruptive forces at work, so it is in the hills of Tombstone—forces as simple as the ordinary forces that work in every housekeeper's kitchen or chemist's laboratory.—*Republican*.

MECHANICAL PROGRESS.

The Art of Fusion.

If a detailed history of the art of melting could be written it would be found to be as full of interest as that of any other of the arts practiced in the manipulation or the manufacture of metals. It has been well known from the earliest time, and it is certain that it was the first to be largely used, as distinguished from the art of forging or of welding, and of brazing or riveting.

The effect of heat in producing fusion or a softened and melted state is at the present day one of the first points to be noted with accuracy in any examination or testing of a new combination of metals. It is also an important guide to those who are aiming to improve the quality of the metals long known and used in the arts.

There are many reasons for believing that the earliest development in the use of metals was the result of accidental application of fire to them, as they existed in their ores, but it is also certain that these chance indications were followed by the most painstaking study of the possibilities of each case, and that the remarkable example of ancient metal-work were in no sense due to any lucky accident, but rather to the skill developed by watchfulness and careful trial of the same methods day after day.

If the ironworkers of the present day have more resources at their command, in the finer qualities of the iron and steel which they employ, than the smiths of ancient time, it cannot be said in strict truthfulness that the result of their handiwork have always been proportionate to the abundance of these resources, or such as to fulfill completely the demands which have been made upon them. It is rare that all lines or departments of an art advance with equal steps, and so it is sometimes found to be true that one will be supplanted by another for a time, and that some incidental or collateral advantage will afterwards lead to a return to the use of the first. The process of welding, for some purposes, has at times seemed to take the place of riveting, but an immense increase in the sizes of plates and bars which it became practicable to roll has turned the scale again in favor of the methods of riveting and pinning for the joining of parts to each other.

So also just now the attention of builders of heavy machinery, and even of large sizes of guns, is turned with deepest interest, and even with great anxiety, to the advance in the art of fusing or melting the high-grade metals, the various qualities or grades of steel of which these heavy pieces are to be made. The progress actually made in this art in this respect is quite sufficient to warrant the fullest expectation that has thus far been entertained of it. The prospect is very clear that with the daily experience of many foundries in the study and practice in the art of fusing that stubborn but valuable metal, steel, the day is close at hand when the more compact and massive pieces or parts of all kinds of machinery will be made of it, to the great advantage of all concerned.

This very important result is due solely to the study and constantly advancing practice of this oldest of all arts in metals, and to the improvements made in the apparatus employed. In this respect the advance from the time of the medieval workers is simply incredible, and indeed the short space of thirty years covers nearly the whole span from the day of a trifling capacity of furnace for melting, to the present time, when the limit is rather the power of existing apparatus to move the finished casting.—*Industrial World*.

COMPRESSING CAST STEEL.—Great advantage is claimed for pressure in the casting of cast steel—the greater the pressure the more satisfactory the result. Mr. E. B. Meatyard, of Lake Geneva, Wis., says: "I make plans on pressing Bessemer steel in the molds, while in a semi-fluid state, to a specific gravity of nearly eight. I have obtained 7.93 in 30-pound masses with 2,500 pounds per square inch pressure. I am going to get 5,000 pounds per square inch on large weights, which will hold heat longer. Ten tons at one time, to a density of eight degrees, with less than five cubic feet of water to actuate three sets of toggles, compounded into each other. Elastic limit, 45 tons; estimated strength was 70 tons, and the ductility was equal to Norway steel, or any first-class mild steel, and all this with a high degree of carbon. Hard and tough is my aim."

STRAIGHTENING HARDENED STEEL.—It is well known that files are not usually drawn after being hardened, and that the hardening frequently springs them out of line. But, notwithstanding that the files are made as hard as they can be by heat and cold water, they are readily straightened after being hardened. This operation is performed at once, as soon as the files have been dipped. The files are taken from a bath of melted lead and chilled while red hot in a tank of running water. This immersion for the instant hardens only the surfaces, while the interior is soft and pliant with heat. At this time the file may be straightened by bending over and under bars. By similar means crooks in steel arbors, reamers and other long tools may be removed, even after they have been hardened and tempered. A cast steel saw arbor had received an offset or crook in the journal at one end just inside the shoul-

der. The crook was at the worse end, that next the saw, and, although scarcely perceptible to the eye when the arbor was turned on its centers, it was sufficient, when the arbor was in the boxes, to throw the periphery of a two-foot saw considerably out. The arbor at the bearing part was very gradually heated, not enough to change color, but to a "black heat." A V-shaped block was placed in a vise bearing against the offset side of the journal, and the vise screwed up. At the third trial the arbor came out perfectly true. A tempered reamer was straightened in the same way, the point at which it was crooked being heated by an alcohol lamp. The heat was sufficient to allow the steel to give, but not enough to start the temper. Steel that has a blue temper only may be straightened by blows with a pony hammer on a smooth, clean anvil, the face of which should be warmed enough to remove the chill.—*Scientific American*.

BRASS CASTINGS.—If what was put in a crucible came out of it, there would be less diversity in results. What with the volatility of some metals and the varied melting points of others, in the same mix, it is wonderful that anything like uniformity can be obtained in ordinary work. Zinc sublimes (burns away) at 773 to 800 degrees, while the heat of the metal with which it should be intimately mixed in making yellow brass—copper—is nearly 2,000 degrees. Zinc, tin and lead enter into compositions of copper, to form alloys in varying proportions (always in definite quantities for a given alloy). It will be seen, therefore, from the ease with which the lesser metals are burned away, at comparatively low temperatures, that it is a very easy matter to make several kinds of metal with the same mix.—*Age of Steel*.

A NEW TOOL FOR MINING USE has just been patented, which combines a candle-holder, fuse cutter and suspending hook, is composed of a bar pointed at one end, to be stuck into a wall, and having a finger ring on the opposite end. Upon the bar is fastened the candle socket. A suspending hook is likewise pivoted to the bar, which is to be used in case the device is to be suspended from a projection. The hook has a small cutting edge which works against a similar cutting edge of the bar. When the fuse is to be cut it is placed on the bar, and the hook swings down.

BLOW-CKOCKS.—Every boiler should have two blow-valves, one placed near the surface of the water, called the "surface-blow," and one placed near the bottom, called the "bottom-blow." The surface-blow is the smaller of the two, and is generally used for blowing out when freshening the water; the bottom-blow is mostly used when blowing out entirely for repairs, or cleaning out. Plug cocks are sometimes used, but they are very inferior to globe-valves for that purpose, or indeed for any other.

SHARP CORNERED DRAWING TOOLS.—A sensible correspondent of the *American Machinist* very justly complains that "manufacturers of drawing instruments make them so full of little sharp corners and interior angles," and suggests that they be made "of round or oval cross sections, with no places where dirt can collect." The trouble is, that makers of drawing tools very seldom, if ever, have any practical experience in the use of such instruments, and are unknown to those who have.

The effect of a safety valve in the lower part of the boiler has been tested in England. A boiler was prepared with the ordinary safety valve and an additional one attached to the lower part, both equally secured. Heated to redness, the boiler had cold water pumped into it, and in a minute a pressure of between 50 and 60 pounds was produced. The lower safety valve was the first to act, giving entire satisfaction to the experimenters.

PROGRESS IN MECHANICAL ART.—In the history of mechanical art two modes of progress may be distinguished—the empirical and the scientific. Not the practical and the theoretic, for that distinction is fallacious. All real progress in mechanical art, whether theoretical or not, must be practical. The true distinction is this: That the empirical mode of progress is purely and simply practical; the scientific mode of progress is at once practical and theoretic.—*Rankine*.

SODA ASH IN BOILERS.—An English boiler inspection company recommends that soda ash be used to prevent scale, instead of soda crystals, and that it be pumped in regularly and continuously in solution, with the feed, instead of spasmodically dumped in solid through the manhole. By many, tungstate of soda, instead of either soda ash or soda crystals is preferred.

HOT JOURNALS AND BROKEN SPRINGS.—In the *Scientific American*, dated March 12th, 1881, there appeared a resume of a series of very interesting experiments, tending to prove that heat is a great factor in making steel brittle. These experiments naturally suggest one probable serious cause of broken journal springs.

Two American locomotives have arrived in Chili, South America, for the Southern railroad. The engines are the first installment of an order for 10 locomotives, 300 cars and 5 restaurant cars. The latter cars are intended for use on the express train.

SCIENTIFIC PROGRESS.

Symbiosis.

Professor Hertwig, according to *Nature*, at the last meeting of German naturalists, read a paper on this subject. This term, symbiosis, first suggested by De Bary in connection with certain phenomena of the vegetable world, is here extended to the whole organic system. As distinguished from ordinary parasitism, it is explained to mean the normal fellowship or association of dissimilar organisms which dwell together in a common abode for their mutual welfare. In the case of parasites the connection is altogether one sided; one of the two organisms attaching itself to the other and flourishing at its expense, as, for instance, the mistletoe on the apple tree.

But in this newly revealed phenomenon of symbiosis, which appears to pervade the whole biological world, both associates are mutually beneficial, and in some instances even indispensable to each other. They act, so to say, like two partners in a well regulated business concern, co-operating in the work of life, taking part in all its toils and troubles, and honorably sharing the common profits. An illustration is drawn from the familiar hermit crab, one species of which, after taking possession of the first available empty shell, goes into partnership with a sea anemone (*Adamsia palliata*). This lonely creature, bright orange spotted with red, attaches itself to the roof of the common abode in such a position that its mouth and prehensile apparatus are always turned toward the head of its associate. It is thus enabled to join in all the expeditions of the restless hermit crab and conveniently share in the common plunder. In return for this service, the anemone protects his companion from his many enemies by means of the numerous long threads which it shoots out at the least alarm, and which are provided with millions of capsules charged with a stinging acid like that of the common nettle. So close is the compact entered into by the two partners, that both have become indispensable to each other, as appears from a series of experiments made at the Neapolitan Aquarium. If the crab be removed from his house, and this be stopped up so as to prevent his re-entering it, he will cast about for another shell, and never stop until his old associate is also transferred to their new abode.

A still more remarkable illustration is drawn from the *imbanba*, or candle nut tree of South America, which strikes up an alliance with a species of small black ant to their mutual benefit. The whole subject of symbiosis, which naturalists are only beginning to study, is calculated to throw great light on the Darwinian theory of biological evolution. The various cases of fellowship between animals and plants of different orders, and even between members of the animal and vegetable kingdoms, show how, in the perpetual struggle for existence, the individual organism avails itself of the smallest advantage to secure a place in the household of nature. It often thus acquires marvelous habits of life, which it is afterward unable to lay aside, and in consequence of which it becomes gradually modified in its bodily form and organization. Thus *abyssus abyssum invoca*, one charge superinduces another, altered conditions require fresh combinations, and the organic world resolves itself into an everlasting ebb and flow of life, in which the individual counts for nothing, the species—itsself transitory—for but little, and the sum of existence alone is considered in the self-adjusting scheme of the universe. Symbiosis thus leads at once to a broader and more searching study of various branches of human knowledge.

To prosecute the subject successfully, vegetable and animal organisms must be examined, normal and morbid conditions attended to, anatomical and physiological questions investigated. For this boundless theme belongs to a border land in which zoology, botany, anatomy, physiology, and pathology meet as on common ground.

THE ARTIFICIAL FORMATION OF MINERALS AND ROCKS.—Nearly all the interesting researches that have been made in forming minerals by artificial means are due to the chemists and mineralogists of France. Among these, none are of more importance than those performed by Messrs. Fouquet and Michel-Levy in the formation of various volcanic rocks and minerals through fusion. Recently they have collected their researches, heretofore scattered in several periodicals, in the form of an important volume entitled "*Synthese des mineraux et des roches*." They employed platinum crucibles incased in fire-clay and kept at a high heat for several days, by means of a gas blast. By making use of the principle that minerals crystallize from the fluid magma in the inverse order of their fusibility, and by keeping the melted minerals at different temperatures, carefully chosen, a number of artificial products closely resembling natural minerals and rocks were produced. Thus from a fused mixture of anorthite and augite, plagioclase crystals were obtained by a white heat, kept up for forty-eight hours, and on a second heating at a lower temperature, augite crystals were formed, and the characteristic structure of an ophitic diabase was obtained. Most of the basic basaltic rocks were thus artificially formed by one or more fusions of a mixture of minerals. The acidic rocks, or those

containing quartz, orthoclase, muscovite, hornblende, etc., could not thus be produced. An amorphous or glassy mass was obtained, and the latter minerals would not crystallize out of a fused mass. The interesting conclusion is therefore reached that granite, gneiss, and other acidic rocks, with their inclosed minerals, are not the result of igneous fusion. This is in accord with the generally accepted belief of geologists, derived from many considerations.—*American Naturalist*.

A NEW MOTOR.—Announcement is made of a new and remarkable motor known as "The Triple Thermic" motor. The motive power is the vapor of carbon. It has been in practical use in driving a sixty-horse power engine for six months past, on West Forty-sixth street, New York. The discoverer of the means of applying the new power and inventor of the machinery adapted to its use is W. S. Colwell, formerly of Pittsburg. It is claimed he has been at work many years on the application of the same. The material from which the vapor is generated, bisulphide of carbon, was discovered in the last century. The force and power of the vapor surpasses that of steam, and its application and regulation are already under more perfect control than steam. The invention or discovery consists in evolving bisulphide of carbon into a vapor for operating machinery by generating heat in a generator and transferring it into a vessel containing bisulphide of carbon. The latent heat of the steam is utilized to convert the bisulphide of carbon into vapor, only 118 degrees being necessary to produce this vapor. A prominent engineer of Chicago, giving the result of his examination of the new motor, says: "I saw a fifteen-horse power boiler with very little fire under it generating steam which operated the new motor, which in turn ran an engine of sixty-horse power." A syndicate has been formed which controls the invention and its patents. The capital stock is \$25,000,000, of which \$8,000,000 has already been realized on sales of stock. Ex-Governor Hubbard, of Texas, and ex-Collector Baird, at Boston, are mentioned as being largely interested in the new motor syndicate.

THE DEAD SEA.—A writer in a German magazine gives a sketch of the famous Dead Sea. He substantially confirms all the traditional characteristics, except as to the appearance of the landscape and some other minor particulars. He declares that no Sicilian bay nor the Gulf of Corinth presents more varied or beautiful coloring, only the water seems darker, as of a molten metal. He denies the general statement that no bird flies over the waters, and that its shores are without vegetation. But he confirms the tradition that no living thing is found in it; fish coming down by the Jordan die at once on coming within its bounds. The water is so "thick" that he moved it with difficulty; its bitterness was terrible; the bottom was slippery, like soap, and one can scoop up with the hand a slime like mortar. The touch of it causes great smart to the eyes. While the temperature of the atmosphere was sixty degrees Fahrenheit, that of the water of the Dead Sea was sixty-four degrees. On coming out of it the body was thickly incrimed with crystals of salt of magnesia and soda.

BOILING OXYGEN.—In a paper presented to the French Academy, M. S. Wroblewski refers to his experiments in the liquefaction of oxygen, and attempts to make use thereof as a refrigerating agent. This he found to be exceedingly difficult, owing to the necessity of using tholiquefied oxygen in closed vessels of great strength, and the very short duration of the ebullition. By means of a thermo-electric method the author was able to get an approximate measurement of the temperature at which liquefied oxygen boils when the pressure is suddenly released, which is stated to be 186° C., or 302.8° F. below zero. This is probably the lowest temperature ever recorded. The author suggested nitrogen, after being compressed, to the action of this extraordinary cold. When the nitrogen was then allowed to expand a little, it solidified, and fell like snow in large crystals.

NOVEL THERMOMETER.—The ordinary mercurial thermometer is, as is well known, based on the dilatation of bodies by the action of heat, and on the difference of dilatation between mercury and glass. A new thermometer, in which the mercury column sinks with a rise of temperature, has, moreover, been introduced by M. D. Latschinnoff, who has based his instrument on the discovery of Kohlrausch, that the coefficient of dilatation of ebonite is greater than that of mercury. Latschinnoff has made the reservoir of his thermometer of ebonite, and the result is that the level of the mercury falls in it when the temperature rises, and, on the contrary, rises when the temperature falls. A rise of 20 degrees Cent. lowers the mercury 25 millimeters.

THE VOLCANIC ASHES FROM JAVA.—It is estimated that the ashes which caused the recent red skies must have reached an elevation of fully sixty miles. On an estimate that a solid mass of one cubic inch of ashes was diffused through 135,000 inches of atmosphere, the entire quality of ashes which floated off in the atmosphere must have been sufficient to form a solid mass one mile high, forty-two miles wide and seven-hundred miles long. This is exclusive of the immense mass which fell upon the sea and land within a circuit of some one hundred miles in diameter.



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SAN FRANCISCO:

Saturday Morning, March 15, 1884.

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Passing Events.

The establishment in our midst of a technical
school in which the trade of cigar making is to
be taught, in order that the boys and girls may
take the place of Chinese, is an important in-
dustrial move. It is to be hoped that the ex-
periment will be successful. In this city the
manufacture of cigars is an important industry,
and will give employment to several thousand
white persons, between 3,000 and 4,000 Chinese
being displaced.

A great number of miners are leaving for the
Cœur d'Alene mines. Travel in that direction
by way of the U. P. R. R. is enormous. About
150 people a day, on an average, go through in
the trains via Granger.

The recent storm has been widespread, and
though doing some local damage in different
places, has been generally beneficial. The
farmers look for heavy crops this season all over
the State, Southern California having been ex-
ceptionally visited by copious rains.

Mining news just now is somewhat scarce,
owing to the fact that the weather has been so
bad it has been difficult for men to get about in
the mountain regions where most of the mines
are situated.

The wages of the men employed by the Star-
mont Company of Silver Reef, Utah, have lately
been reduced. Now the engineers and black-
smiths receive \$4 per day; miners, \$3; top
hands, \$2.50; amalgamators at the mill, \$3.75,
and wages of all other employees have been re-
duced accordingly.

Iron in California.

California does not cut much of a figure in
the production of iron ore. Among the Pacific
coast States and Territories, however, she is
second in production of pig iron, and first in the
manufacture of rolled iron, rails, etc. The
latest full statistics we have are those of 1882.
Then Oregon produced 6,750 tons of pig iron,
and California 987 tons. But Oregon made no
rolled iron, rails or anything of the kind. Cal-
ifornia, however, produced 25,843 tons of rolled
iron, including iron rails and nail plates. She
made 3,036 tons of iron rails and 5,164 tons of
steel rails in that year. In 1881 California
produced 4,414 tons of pig iron, Washington
Territory 1,200 tons, and Oregon 6,100 tons.
This was all charcoal pig.

California's production of all kinds of rolled
iron (including iron rails and nail plate) from
1873 to 1882 was as follows:

Year.	Tons.	Year.	Tons.
1873.....	7,420	1879.....	15,952
1874.....	16,221	1880.....	15,277
1875.....	14,194	1881.....	19,839
1876.....	15,465	1882.....	25,843
1877.....	11,542		
1878.....	13,251	Total.....	115,094

California's production of rolled iron (exclud-
ing rails and plate and sheet iron) for 1873 to
1882 is shown in the following table. This in-
cludes bar, bolt, skelp, hoop and shaped iron
and railroad axles:

Year.	Tons.	Year.	Tons.
1873.....	6,945	1878.....	6,472
1874.....	9,205	1879.....	9,016
1875.....	6,121	1880.....	10,555
1876.....	6,836	1881.....	14,204
1877.....	5,792	1882.....	22,507

The production of all sizes of iron rails in Cal-
ifornia has been as follows:

Year.	Tons.	Year.	Tons.
1873.....	475	1878.....	6,790
1874.....	7,016	1879.....	6,936
1875.....	8,073	1880.....	4,722
1876.....	8,629	1881.....	5,935
1877.....	6,750	1882.....	9,638

In 1881 and 1882 we made steel rails. The
product of both iron and steel rails in this
State in 1881 was 6,035 tons, and in 1882, 8,200
tons. The Pacific Rolling Mills, in this city, do
the work on rails and other rolled iron. Our
foundries use large quantities of wrought and
cast iron, so that a great deal has to be brought
to this coast.

Iron ore is now mined in 25 States and two
Territories as follows: Maine, Vermont, Massa-
chusetts, Connecticut, New York, New Jersey,
Pennsylvania, Delaware, Maryland, Virginia,
North Carolina, Georgia, Alabama, West Vir-
ginia, Kentucky, Tennessee, Ohio, Michigan,
Wisconsin, Minnesota, Missouri, Texas, Colo-
rado, California, Oregon, Utah and Washington
Territories. Very large deposits are found near
Lake Superior, in Michigan and Wisconsin;
near Lake Champlain, in New York; in south-
eastern Missouri; in northern New Jersey, and
at Cornwall, Lebanon county, Penn. Smaller
deposits are innumerable.

There are several interesting facts relating to
the distribution and development of our iron
and steel industries. Massachusetts is a large
producer of rolled iron, but the raw materials
for its manufacture are almost wholly procured
from foreign countries. Michigan is a large
producer of pig iron, every ton of which is made
with charcoal, although five-sixths of all the
pig iron in the country is made from coal.

Delaware makes nothing but rolled iron,
and Georgia makes nothing but pig iron. Tennes-
see is the most progressive of all the Southern
States in the manufacture of iron and steel.
After Pennsylvania the largest producer of
iron rails is Indiana. The United States Gov-
ernment is a manufacturer of rolled iron at the
Washington navy-yard. California rolls more
iron than Connecticut, and Wyoming Territory
more than Maine and New Hampshire united.
Wheeling makes more nails than Pittsburgh,
but Pittsburgh makes nearly three-fourths of
all the crucible steel made in the United States.
Blossoms and billets made directly from iron ore
in forges, which is the most primitive of all
methods for the manufacture of iron, are pro-
duced chiefly in the Champlain district of New
York, and blossoms made from pig and scrap
iron in bloomeries, according to the old Wal-
loon method, are made chiefly in Pennsylvania.
Down to 1855 charcoal was the principle fuel
used in the production of pig iron in this coun-
try, but in that year we made more pig iron
with anthracite coal than with charcoal. Anthra-
cite remained the leading fuel for use in blast
furnaces down to 1875, in which year bitum-
inous coal and coke became the principle fuel
for this purpose, and this position they have
since maintained. Bessemer-steel rails were
first manufactured in this country as a com-
mercial product in 1867, but ten years elapsed
before their production equaled that of iron
rails. This occurred in 1877. In 1882 the
production of steel rails was more than six times
as large as that of iron rails.

A New Industrial Movement.

Within a few weeks the cigar manufacturers
in this city resolved to get rid of the 3,000 or
4,000 Chinese employed by them, so they
banded together and "locked out" their Mon-
golian employees. These men are still out.
The manufacturers have formed an organiza-
tion called the Cigar Manufacturers' Associa-
tion of the Pacific Coast. Then, knowing that
on this coast there are few whites able to make
cigars, they decided to incorporate, with a
capital stock of 100,000, divided into 5,000
shares of \$20 each, to found a technical school
for the education of our white youth in the
mysteries of cigar making. The school is to be
fitted up with all necessary tools, machinery
and appliances, with proper instructors and a
superintendent. The scholars are to be trained
both practically and theoretically. The gradu-
ates are to be allotted to the several manufac-
tories for employment in proportion to the
amount of stock each manufactory may have in
the corporation. Shares to the value of \$70,000
were subscribed for, and \$2,600 contributed
towards the project.

The following Directors were unanimously
elected to incorporate the association, to com-
mence operations at once: J. W. Shaeffer, H.
Engelbrech, E. Goslinsky, Rudolph Mayrisch,
Sol. Falk, I. S. Rosenbaum, Sam Lewis,
M. Kaufman and J. S. Bowman.

Suitable rooms are to be secured and fitted
up with necessary appliances and machinery,
and superintendents and instructors are to be
employed, a supply of leaf tobacco being laid in.
The product of the pupils' labor is to go to de-
fray the expense of the institution, which con-
templates a superior technical training in the
manipulation, selection and grading of tobacco.
Rooms have been received for the "school," and
already applications have been made from 152
girls and 315 boys. This shows that the in-
dustrial school is going to do some good and
was needed. Anything that will give steady
employment to the boys and girls of the city is
of great benefit to the community, for it is a
fact that there are too few occupations open to
our youth. Parents and guardians should avail
themselves of this chance for securing for those
dependent upon them the knowledge of a trade
which will enable them to earn a decent liveli-
hood. The technical school should always be
filled to its utmost capacity, those who have
become proficient making way for beginners.
By this means a steady supply of skilled labor
would be kept up.

Industrial Notes.

There are 550 hands at work in the Oakland
jute mills.

The boiler works of Miller, Fisher & Ketscher,
in Oakland, employ 21 men.

The stormy weather has kept back work on
the proposed new glass factory at Oakland.

The sweeping by machines of 197 miles of
streets in this city in February cost \$6,731.

The tack factory, at the Judson Iron Works,
across the bay, is nearly completed, and will
soon be in operation.

M. Pardini & Co. have been given permission
by the Supervisors to maintain a steam boiler
at 912 and 914 Battery street.

The telegraph line franchise to Point Lobos,
petitioned for by Robert Day and others, has
been finally granted by the Supervisors.

H. Huddleston & Co. have applied to the
Supervisors for permission to maintain a steam
engine and boiler at Nos 322 and 324 Fremont
street.

At Turner's yard, Benicia, the yacht *Nellie*
is being strengthened and overhauled. The
small schooner for Point Reyes trade will be
launched shortly.

In January and February 59 buildings were
put up in Oakland, at an aggregate cost of
\$121,450. Most of them were small dwellings,
costing about \$2,000 on the average.

White, the North Beach ship builder,
launched a new schooner this week, called the
Ountmak. She is to run to the Choumagin
islands, up north, in the fishing trade.

At the last meeting of the Board of Super-
visors a resolution was adopted directing the
City Engineer to revise the plans and specifica-
tions for the construction of brick sewers, etc.,
in Eighteenth street, from Guerrero to Dolores
street, and in the crossings of Eighteenth and
Dolores, and Eighteenth and Church streets, so
that the brick-work shall be twelve inches
thick instead of eight inches, as at present
provided; also to furnish carefully prepared
estimates of the cost and expenses, etc.

Ship spars from this coast have a world-wide
reputation. An Oregon spar is the toughest
piece of wood known, when size and lightness
are considered. Oregon pine will bend and
twist without breaking to a surprising extent.
Ship loads of these spars are occasionally sent to
Europe and elsewhere. The ship *Snow* and
Burgess, now here, will take a load of spars
from Port Blakely to New York. The Eastern
ship-wrights need the wood badly.

Gold in the Black Sands.

[Written for the Press.]

I have written much on the loss of gold as
connected with quartz mines, but it is not on
this department of industry wherein all the
gold is lost. Our hydraulic drift and river oper-
ations may be charged with having even a
higher percentage of wastage.

Within the past year I have given consid-
erable attention to these departments of mining,
and regarding my results as of general interest
here give them in part. The great loss of gold
in our hydraulic drift river workings is in that
associated with the black sands. From the
earliest days of California every prospector for
Placer or river "diggings," regarded the "black
sand" prospect as of especial value for good
diggings. Every '49er knows how gold in black
sand was used in those good old days of '49
and '50 for sanding letters, and how many
referred with pleasure to the fact that he
sanded his freshly written letter with the
golden sands.

As to the value of these sands, I know now
large quantities could have been had then,
worth all of \$10,000 per ton, as even within
the past year I have made tests almost as high.
Every hydraulic drift and river claim has
these sands in larger or smaller quantities,
and yet there is no effort to save them.
But says one, "How are you going to save
them?" I can answer this by saying,
"Where there's a will there's a way."
Another says, "Oh, we don't loose much;" and
here "ignorance is bliss." Another says, "Sup-
pose we do save them, we can't get the gold
out; they have been trying that for twenty
years, and all have been failures." To this I
will say, get the sands with the gold in, and I
will guarantee to get it out.

If every miner clearly comprehended the loss,
his mind would be disturbed, until he sought at
least to save some. It is one thing to make an
assertion, and another thing to prove it. I
make none I cannot prove, and know what I
am talking about.

To make my statements more clear, I will
now give you several of my lowest tests, and
none of the very highest, simply stating the
class of mining. These tests are made in a very
practical way, and ranging in quantities from 3
pounds to 30 each, but mainly 5 pound tests,
and one thousand tons can be worked just as
easily.

Tests from Hydraulic Mines.

No. 1, per ton.....	\$22 20
No. 2, per ton.....	30 00
No. 3, per ton.....	347 00
No. 4, per ton.....	28 75
No. 5, per ton.....	163 00
No. 6, per ton.....	12 00
No. 7, per ton.....	475 00
No. 8, per ton.....	54 00
No. 9, per ton.....	221 80
No. 10, per ton.....	240 00
No. 12, per ton.....	90 00
No. 13, per ton.....	140 00
No. 14, per ton.....	98 00
Average, per ton.....	\$152 05
No. 1, per ton.....	\$ 60 00
No. 2, per ton.....	15 80
No. 3, per ton.....	65 50
No. 4, per ton.....	211 80
Average, per ton.....	\$103 25

Lowest Tests from River Mining.

No. 1, per ton.....	\$10 00
No. 2, per ton.....	27 00
No. 3, per ton.....	15 40
No. 4, per ton.....	17 75
Average, per ton.....	\$14 21

Test of Ocean Beach Sands.

No. 1, per ton.....	\$ 9 32
No. 2, per ton.....	2 10
No. 3, per ton.....	3 50
No. 4, per ton.....	18 50
No. 5, per ton.....	18 00
No. 6, per ton.....	2 30
No. 7, per ton.....	1 35
No. 8, per ton.....	80
No. 9, per ton.....	4 20
No. 10, per ton.....	1 75
Average, per ton.....	\$6 82

The \$2 10, \$4 50 and \$1 35 are of the
black sands of the ocean beach below the Cliff
House. On the entire coast of California can
be found these sands in small or large quan-
tities. Thus there is more truth than poetry
in the glowing sentence, "The golden shores of
California."

It is proper to state that there was no very
close connection of these sands.

Thus I prove my assertions as to the loss. I
have the gold buttons from most of these tests,
as well as others, which those interested can see
at my office, room 20, Safe Deposit building,
San Francisco.

Now, should there not be an effort to stay
this loss, and thus have more gold to gladden
the hearts of the lovers of it and render more
comforts to mankind? It only requires an
effort, and these sands can be separated from
the debris. The extraction of the gold is the
second problem, and is easier than the first.
This saving, once inaugurated, would soon add
millions of dollars annually to our golden pro-
duct.

ALMAHIN B. PAUL.

San Francisco, March, 1884.

PRITCHARD, the discoverer of the Cœur
d'Alene mines, says that in the spring he in-
tends to astonish the natives by opening up
some new diggings that will be superior to any
on Pritchard Creek. Other old miners say
that from the indications good mines will also
be discovered on the Huron trail to the mines.

Gold in the Potsdam Formation.

At a meeting of the American Institute of Mining Engineers, Mr. Walter B. Devereux, E. M. of Globe, Arizona, read a paper on "The occurrence of gold in the Potsdam formation, Black Hills, Dakota." From this paper we make the following extracts:

The special conditions under which gold occurs in the Potsdam formation of the Black Hills present features worthy of a more systematic presentation than they have heretofore received. The notes which are comprised in this paper relate to the immediate vicinity of the Homestake vein, where are found the only deposits of the character referred to which have heretofore attained any importance as gold producers. At this point the oldest visible formation comprises the highly metamorphic paleozoic schists, which contain the gold-bearing quartz veins. Resting unconformably upon the schists is a sedimentary formation composed of debris derived from the schists, and containing the evidences of the life of the Potsdam period. The base of this formation is generally a conglomerate, which, at the Homestake vein, is very thin or absent entirely. Its section here is that of a wedge, the thin edge of which comes nearly to the Homestake vein. Early in the history of the Black Hills much excitement was caused by the discovery of gold in paying quantities in the lowest stratum of the conglomerate above referred to. The ore was readily obtained by a system of horizontal drifts, and many hundred thousand dollars were obtained in a short time. Owing to the peculiar character of the ore, the mines were known as cement mines, although the material was a true conglomerate, generally hard, and needing the stamp mill for reduction. The larger number of these deposits were found upon the eastern side of the Homestake vein, and within a perpendicular distance of about a mile. Only one paying deposit has been worked upon the western side. At present the larger number have ceased producing, and it is not probable that they will ever attain the importance that they have had, since the productive territory has been extensively prospected. The conglomerate, in places, partakes of the character of a breccia, and generally gradually merges, in the upper strata, into sandstone, or, where there has been local metamorphic action, into quartzite. The mass of the conglomerate is a mixture of quartz boulders and pebbles, and worn fragments of schists, with frequent pebbles of hematite. While there is a slight slope away from the Homestake vein, such as would be natural in a beach, the contact of sedimentary and schistose formations is essentially a plane with a slightly undulating surface, due to the unequal durability of the underlying formation. Gold occurs in these sediments in two distinct conditions, viz.: First, Gold as a mechanical constituent. Under the first head I class the principal portion of the cement gold which has been mined, while under the second head I wish to speak, in the latter part of this paper, of some gold ores of an entirely distinct character, which are found some few miles distant in the same formation. I am aware that in classing the gold of those conglomerates as a purely mechanical constituent, I am doing so in opposition to a theory, recently upheld by an elaborate argument, which endeavors to prove that placer gold is a product of local precipitation or crystallization. Careful observation in the field and a consideration of the facts, have, however, led me to reject this theory as untenable and incompetent to explain the conditions noted, and I hope in this paper to present evidence which shall justify this conclusion. The horizontal character of the sediments and the fact that their accompanying life-forms belonged to salt-water types lead us at once to the conclusion that they were ocean sediments and not river beds, and that they were formed in very shallow water, where there was strong wave action. The thinness of the deposits near the Homestake outcrop and the coarseness of the material indicate that they were beaches. The absence of gravel over the quartz outcrop shows that it was either insular, or perhaps a shallow reef.

We know that this absence of gravel is not due to more modern erosive action, because the eruptions of porphyry occurring in later geological times, and yet before the modern valleys were scoured out, have capped over the vein outcropping, and preserved it intact in many places.

This same porphyry has also overflowed the Potsdam sediments, thus giving us the proof that they were originally as shallow as they now are. In some places we have at least a hundred feet of conglomerate over the gold-bearing material, but generally much less. In order to show that the Homestake vein was large enough to have supplied gold for all these deposits, I need only mention that its outcrop, as covered by the porphyry, was at least a mile in length, and from one to two hundred feet in width, of solid, gold-bearing material.

Much of the conglomerate has been cut away by the formation of the present topographical conditions, and we can only construct the original contact plane by noting the different points at which it intersects what are now hills.

The appended sketch is an approximate section taken perpendicular to the Homestake vein

and extending eastward to the limit of the gold-producing territory; in all, perhaps a mile and a half in length. It shows how small a portion, comparatively, of the old sea bottom remains. From it we see, also, that the site of Central City was once overlaid by a placer—probably richer than the mines in the hills on either side, which have yielded so much gold. The contact plane has a dip of about ten degrees away from the Homestake vein. First considering the gold which remained in the matrix of gravel, we will afterward endeavor to show what became of the gold again set free during the disintegration of the conglomerate. The larger portion of "cement gold" (using the local term for convenience) has been taken from the ridge shown in the sketch between Deadwood and Black Tail gulches.

Ore mined from this ground is said to have milled as high as fifty dollars per ton, and the stratum lying close to the bedrock was exceedingly rich, as is generally the case where the ore pays at all. Small channels and depressions caused local concentrations, and these channels were generally followed in the process of mining. The ore was hard, and generally required blasting. This condition was very advantageous in studying the character of the deposits, since large blocks could be taken out and examined in detail. If the term

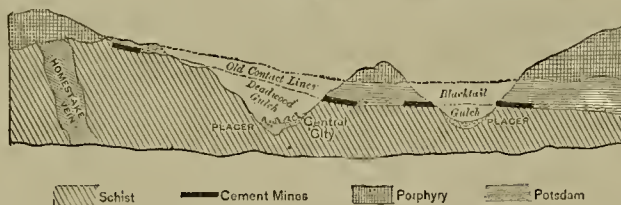


Jan. 15, 1884.—Jupiter at 17h 11m G. M. T.

might be used in such a sense, these were fossil placers, in which the most minute relations were carefully preserved, although originally existing in a very unstable material.

In general we find much the same variations of quantity as are shown in the ordinary gravel placer. The local channels referred to show the same alternations of rich and poor material, due to different conditions of current, and the universal occurrence of the greater part of the gold near the bed rock.

The cementing material of the conglomerate was generally oxide of iron, and the gold which had lain on the bed rock was often attached to the overlying boulders by this medium. In general, where conditions had been such as to allow the subsidence of other materials of high specific gravity the gold was most abundant, ordinarily with large quartz boulders or with pebbles of hematite. The latter were seldom found without gold being attached to them, the pebbles themselves having a smooth, polished surface. In general, the position of the gold was always such as to point to its great specific gravity as the locating cause, and not to solution or precipitation. In fact, the many curious positions in which I observed the gold were such that no satisfactory explanation could be found except the one noted above. Upon one



APPROXIMATE GEOLOGICAL SKETCH FROM HOMESTAKE VEIN, EASTWARD.

quartz boulder, which had lain directly upon the schists, I found, after removing the decomposed talc from the bottom, that grains of gold of almost exactly the same size were arranged in ribbon-like layers in such quantity that half an ounce could probably have been covered by the hand. Each grain of gold is generally covered with a thin coating of oxide of iron, which needs a blow to loosen it.

Small basins or enlargements in these channels are sometimes found, which are perhaps one hundred feet across, in which the gold has been deposited in larger quantity. These have the appearance of having been formed by whirlpool action.

The fineness of this gold is greater than that of the quartz veins, as is generally the case with placer gold. This is a perfectly rational condition, since from the time it is liberated from the vein the gold is subjected to the action of various chemical agencies, which naturally act more energetically upon the silver than the gold of the alloy. In the case of the gold in question, we have not only the ordinary conditions, but the added ones that must have resulted from the saline waters, and the solutions of iron which produced the large amounts of oxide of iron noted. In one case the latter amounts to a bed several feet in thickness, lying over the gold cement. Combined with these chemical agencies was the heat produced in later times by the porphyritic intrusions and overflows.

Dark Transits of Jupiter's Satellites.

At the meeting of the California Academy of Sciences held on Monday evening, March 3, 1884, Professor Davidson, the President, called attention to the observation of the black transits of the third and fourth satellites of Jupiter made by Messrs. Burekhalter and Hill and himself.

The first observation was upon the transit of the third satellite and its shadow over the disk of the planet on the 15th of January, at 9 hr. 1 min. local time, by Professor Davidson. It is illustrated in figure 1, wherein the small dark disk is the shadow of the satellite with the partially dark image of the satellite itself three or four diameters to the right. The figure gives the appearance of the planet, etc., in the inverting telescope.

When it was examined with powers of 120 to 150 diameters the image of the satellite itself showed nearly as dark as the shadow, but not quite so large. After making the first drawing the atmosphere was steady enough to admit using 255 diameters. This was twelve minutes later, and then the satellite was seen as a circle with a segment of two-thirds the disk bright white and the other segment of one-third the disk dark or black. Upon again testing with



Jan. 24, 1884.—Jupiter at 19h 54m G. M. T.

the 120 power the same effect was revealed. The two were moving along, and upon the dark-brown red belt which has been persistent on Jupiter for some time, and yet they were very markedly black. The shadow was like a drop of ink. The satellite preceded the shadow about 22 minutes of time. The observations were made with the 6.4 inch equatorial.

The President then read two short memoranda furnished by Messrs. Hill and Burekhalter upon their observations of the black transit of the fourth satellite on the 24th of February. The observation of Mr. C. B. Hill was made at the Davidson observatory, and that of Mr. C. Burekhalter at his observatory in Oakland, and therefore they are independent observations of the same phenomenon.

Mr. Hill reports: "On turning the equatorial on Jupiter about eleven and one-half hours I was surprised to see what was apparently the jet black shadow of one of the satellites. On looking it up in the Ephemeris to see what satellite it could belong to, I found that the only phenomenon in progress was the transit of IV, the shadow of which should not come on until 15 h., 43 m., or four hours later, so that this was evidently a "black transit" occurrence. The "seeing" was only moderately good, and as the edges of the planet were not sharp, I concluded there would be no use in

note 2, to illustrate his observation. It is a reproduction of the original in the note book.

Mr. Burekhalter writes: "Last night I observed the transit of Jupiter's fourth satellite; the first contact was about two minutes later than the almanac time, and the satellite was about eight minutes getting completely on the planet's disk. The air was very steady and definition good. The satellite entered the white portion just south of the great, dark red belt. I observed the satellite for about five minutes after the internal contact, and saw nothing unusual, but on the contrary could only see the bright satellite on the white belt with difficulty. At the almanac time of 11 oc. dis. (8 h. 53 m. L. M. T.) Mr. W. H. Lowden took the instrument to observe the phenomenon, and he at once announced that there was a shadow of a satellite on the planet. Thinking he must be mistaken I again looked and found, as he had said, a black spot 'as black as a drop of ink,' and I then noticed that this spot occupied about the position of the satellite then in transit. I then thought I must have made an error, but upon referring to the Ephemeris, I found that no shadow should be on at that time, and that consequently it must be the fourth satellite projected on the disk as a black spot instead of the usual bead of light. This phenomenon so occupied our attention that the oc. dis. was allowed to pass unnoticed. Thereafter we watched the spot at intervals for nearly an hour, during which time it remained absolutely black."

It will be noticed that Mr. Burekhalter observed the satellite enter as a white disk on the body of the planet, and that it was subsequently seen black. He observed with a ten and a half inch reflector, but does not report the magnifying power employed, and has furnished no drawings.

Mr. President then referred to the earlier notices of these or similar phenomena. It was first reported by Cassini in 1665, and afterwards more fully described by Maraldi, in 1707.

It was not again mentioned until 1796, perhaps from inattention to the subject, but more recently the great telescopes have revealed these peculiarities. South saw two satellites on the planet, but of a chocolate color. Bond, on the 28th of January, 1848, at Harvard, observed the transits of I and III. "Whilst III itself was seen as a black spot between the two shadows, and not to be distinguished from them except by the place it occupied, it was smaller than its shadow in the proportion of 3 to 5, not dusky simply, but quite black like the shadow."

Again on the 18th of May, 1848, Bond saw the III satellite enter the disk very bright; twenty minutes later it was hardly perceptible; a little after it was a dark spot; then for two and a half hours perfectly black and nearly round.

The transit of IV on March 26th, 1873, was remarkable for its absolute blackness, and was seen by many observers in England.

Several dark transits of I were recorded in England in 1880, and it is quite likely that the literature upon the subject of Jupiter may reveal other notices.

Several solutions of this curious problem have been offered, and were mentioned by the speaker, but none have been satisfactory.

NOTE.—The cuts are made somewhat darker than the drawings furnished us. The black disk in Fig. 2 should be slightly larger to be in exact proportion.—Eds. Press.

Mechanics' Institute.

The Mechanics' Institute held its annual meeting Saturday evening at the Mechanics' Library rooms on Post street, P. B. Cornwall in the chair. J. A. Baner, P. B. Cornwall, D. A. Macdonald, David Kerr, G. H. Hopps, W. P. Stout and S. J. Hendy, who were elected Trustees at the last meeting, were duly installed. After the meeting the Trustees withdrew and organized as follows: P. B. Cornwall, President; David Kerr, Vice-President; J. A. Baner, Treasurer; W. P. Stout, recording Secretary, and S. J. Hendy, Corresponding Secretary.

The retiring Treasurer rendered his report, which shows that the receipts from the library amount to \$18,770.58; receipts from the Pavilion, including receipts from the eighteenth Industrial Exhibition, \$45,838.95; receipts from the Lick Trustees, \$10,000; money on hand at the beginning of the year, \$2,560.22, the total receipts amounting to \$75,169.75. The disbursements were \$97,181.03, leaving a balance of \$7,986.74. The institute's property, consisting of library, Pavilion and property on Post street is valued at \$608,539.50. The liabilities amount to \$164,500, leaving the net assets at \$444,039.50. The President reported the Institute to be in a most gratifying and flourishing condition.

Horace Wilson, the librarian, submitted his report as follows: During the year 748 members were received, or 338 more than last year, making a membership of 1,919 persons at the present time. There were 2,033 new volumes added to the library during the year, making a total of 34,673 volumes in all. The circulation of the library was increased from 44,236 volumes to 51,464 volumes.

The new Board of Trustees were authorized to make preparation for the nineteenth industrial exhibition.

REPORTS from Aurora say that the Silver Lining mine is turning out much better than expected by the contractors who are at work on the property.

Industrial Education.

This is one of the subjects which the people rightly regard of the highest importance, and the reformation of the public schools so as to include elementary industrial instruction is now a live theme. As we lately stated, an experimental effort in this direction is being made by the Oakland School Directors. The following is a paper read by C. M. Drake of Santa Paula, Ventura county, at the State Teachers' Association, lately held in this city:

The subject we are discussing this afternoon is one of great and growing importance. It is one which has already been decided in the affirmative by some of the most enlightened nations of Europe, and it is now knocking at our doors and demanding admittance into our educational system.

This is a practical age, and it is fashionable for literary men to condemn it as being too eager for money making. Now I am heretical enough to believe that money making is one of the most important pursuits of man, one of the things of prime importance to us as individuals. I have very little respect for a man who devotes all his time to money getting, but I have still less regard for one who will not earn his own living. The endeavor to live upon the earnings of others is the cause of far more than half the crime in the world.

If a person does not know how to make a living his education is comparatively worthless. I think all will acknowledge this. Again, the more easily a man can earn a good living the more time will he have to devote to those things which are higher and more refining than mere money-getting, and the less desire will he have to engage in dishonorable pursuits.

Civilization could not begin, neither can it flourish in those countries where climate or soil makes life one hard struggle for bare subsistence. So if life has to be one continual toil for the necessities, then the refinements, the cultures of civilization must be left alone.

But a plea for industrial education is not a plea for less work, but for better work, more intelligent work, more productive work. We now try to cultivate the mental part to the exclusion of the physical. The ear and the eye are trained, but they must work with the abstract rather than the concrete; with the ideal instead of the real. The more school culture our children receive the farther they seem to be removed from every-day usefulness; the less fitted to be successful workers in the honest fields of to-day. I could find you, if need be, a score of college graduates herding sheep on our California hills for \$15 a month, competing with boys and Indians. The most useful part of our education is learned outside of the school room, away from that place which is supposed to be especially devoted to the acquirement of useful knowledge. The best half of my knowledge was gained outside of school and in spite of school; and more than half of my school life was wasted over things of little value to me or to my fellow men. As a teacher, I declare that one-third the work we do in the school room is of very little benefit to our pupils. Shall we go on thus wasting the time of our children, refusing to try anything which promises better results, because we are wedded to our old-time idol? The opponents of industrial education claim:

1st. That we have not the time to add so much new work to the already crowded curriculum.

2d. That the public school is not the place to teach trades.

3d. That the great increase of cost which industrial education would necessitate would not be borne by the people.

4th. That we cannot teach all trades, and it would be wrong to select one or two and exclude others just as useful.

I believe these four objections cover the entire ground. Let us examine them one by one.

I. Have we the time to add this new work to our school duties? If we continue to teach what we do in the way that we do, we have not the time in a majority of our schools. But what do our best educators say? All agree that the hours of mental work we require of our children are far too many; that such long continued mental labor is hurtful to mind and to body; that children will actually learn more if required to study fewer hours, as half-day schools have repeatedly proved.

The majority of our high school graduates, the finished products of our present system, are mental dyspeptics, whose shattered nerves, hollow chests, shallow faces, weak, short-sighted eyes, uneven tempers and liability to numerous diseases, speak in the most emphatic tones to those who are not willfully deaf, of the cruel wrong done them by our course of study. They should have had physical labor mixed with their mental work. The country boy who leaves his books in his school-room at three o'clock, walks one or two miles to his home, tends to his stock and other chores, comes back the next morning at nine full of life and energy. I say unhesitatingly, that a teacher who habitually requires his pupils to learn book tasks outside of school hours is too ignorant of the laws of health to be a teacher. I am thankful that public opinion is becoming more and more settled in the belief that school work should be strictly confined to school hours, and not only the pupil's work but the teacher's. When I see a teacher taking home a pile of uncorrected papers I may admire his faithfulness, his in-

dustry and his willingness, but I must condemn his judgment. Better, far better for himself and his school, that he should spend those hours at some manual labor, tending to his bees or his stock, his garden or his woodpile, or taking a tramp of five or six miles to learn something new from mother nature. We teach too much grammar, too much geography, too much arithmetic, too much of many other studies in our common schools. We try to give our children mental food too rapidly for the youthful digestion. We crowd their minds with useless, ill-arranged, indigestible facts. Cut out this needless work, this useless labor, and we shall have plenty of time for industrial education. Combine arithmetic with mechanical labor, chemistry with cooking, natural history with agriculture, and we can make room for all the time we need. It is not the time we lack, but the knowledge of how to employ it most profitably. Our country schools spend enough waste time on arithmetic and grammar alone to give an hour and a half a day to industrial training.

II. Is the public school the place to teach trades? To the question, "Why are we justified in taxing Americans to support public schools?" the reply of educators has been, "To preserve the State; to make good citizens; to save the money which would otherwise go to support jails and penitentiaries." Is there one of these answers that could not be used with increased force in favor of industrial education? Who fills our jails, our State prisons and our poor-houses? Is it the honest, industrious mechanic? The hands of criminals are white with the fear of work; soft with the shame of idleness. The temperate mechanics in the whole United States would not keep even one prison filled. It is because labor is not made a duty and a habit in early life, that so many shun the toil of honest trades and prefer to dawdle behind a counter or grow pale over a ledger. *It is considered so much more respectable to measure a yard of ribbon than to hammer out a plowshare.*

III. Would the people stand the increase of taxes necessary to start this new education, when they are already taxed almost beyond endurance? They are taxed far too much, I do allow. But it is not the two % State and county tax that is grinding them to poverty, though this tax is far higher than there is any need of. I lately wanted to build a \$1,000 school-house in the district where my farm is. The people said, "We cannot afford it." Said I, "Give me your tobacco money for one-half the number of years your bonds will run, and I will pay every cent of your school taxes. Nay, more, I will seat and furnish your school-house as no other district in Ventura can afford. I will buy a bell that can be heard all over the district. I will even carpet the room with Brussels, and I will make money by my offer." "I should say you would," said one objector, "whose taxes would not have averaged \$3.25 a year; I spend \$50 a year on tobacco, and I don't use near so much as some of my neighbors." Strong drink costs three times what industrial education would if we had to double our taxes. Some districts, some people, will object to any new cost of education, but I know there are hundreds of districts and thousands of people in California that are ready now to put their hands into their pockets and help along this good work of industrial education. Nor would the increase of cost be very great. An acre or two more of land, a few tools, a little material to start with, and the cost would be more than repaid in a single generation. Nay, it would return like the seed sown into the mellow ground with a 7x7 increase.

IV. What could we teach that would benefit all? We cannot make all the pupils carpenters, or blacksmiths, or farmers, and it is not fair to give one employment the preference over another equally important, or force a pupil to learn a trade he will never follow.

At first sight this seems to be the most reasonable objection of the four, but I think its weight disappears if we look at the matter aright. The musician who learns to play well upon any one instrument can learn to play others with comparatively little labor. A student of other languages finds that each new tongue makes the other easier to acquire. So a good carpenter can learn the blacksmith trade in one-half the time it would take him had he no mechanical education. But there is a certain amount of mechanical skill which all should possess, certain things that all should know.

Will any sensible man say that his wife should not know how to make a good loaf of bread, or to sew up a torn garment with neatness and dispatch? Does any woman wish her husband to be unable to saw a board straight, or not know enough to drive a nail in without pounding his fingers? Must he go for the tuner if a bit of dust gets in the organ-reeds, or the hardware man be sent for if the stove pipe comes apart?

There are many things happening every day of our lives where a little mechanical knowledge would save money, time and temper, and the last is not the least desirable of the savings. But of far more worth than the mechanical skill acquired would be the habits of honest work the children would acquire. Though a Lincoln may not split rails in mature years, nor a Garfield continue to tread the towpath, yet the benefits of their early toil lasted them until the last day of their lives. The education of hard work is not sufficiently appreciated.

My colleague has considered the subject more in relation to the city schools, but we of the country districts want to enjoy this new and

better education. Our children are taught how to work, but seldom why they work or even the best way to work. But the opponents of industrial education say that it is impracticable to introduce manual labor employments in our public schools. Let us see if it is. Boston and other cities have organized successful sewing classes, which teachers said did not interfere with other school duties. Miss Corson has shown that the science of cooking has no difficulties which would debar it from the school room. Though this is not the time or place for methods, yet industrial education must be shown to be practicable at a reasonable cost before it will be adopted. We cannot afford in most places to imitate the \$100,000 manual training school building in Chicago, nor the new department just started in Girard College, nor the \$500,000 industrial school in Virginia. Such schools have their place, and a noble place, but we want something for small schools—for light pockets.

I will give one example out of the many which could be given of an employment, which, if properly carried out, would give pupils in country schools a good, industrial education, and a scientific training as well. I refer to apiculture. Lessons in natural history, in the use of tools, in experimental observation, in the laws of breeding, and in many other things useful to all, could be given by a small apiary connected with the school. In most places, such an apiary properly cared for would pay far more than the expenses of running it, and repay the first cost in three years.

But time alone can settle what it would be best to teach, and how it would be best to teach it. I wish merely to show that an industrial education is practicable, at a reasonable cost. It will increase the cost, but whatever is worth having, is worth paying for, and our ignorance of industrial training is constantly costing us enormous losses of money and of health, of comfort and of culture.

As the years go by I often recall the words of my wise Quaker father, spoken to me when I desired to leave the farm to study my profession. He said: "In coming years thee will not regret the time thee has spent upon the farm; and thy knowledge of farm work will make thee feel independent of any school trustees. For should thy profession at any time fail thee, the plowhand can give thee an honest livelihood." And I feel glad to-day that I can earn a good living outside my school-room. I have spent half my life teaching in district schools, I have studied on this question of industrial education for years, and I feel sure that industrial education, including the elements of trades, could and should be given in our public schools. The way is growing clearer; public opinion is rapidly advancing in that direction, and we may all live to see the time when teachers more enthusiastic, more competent than we, shall show the way to the education of hand as well as head; of body and mind alike. The coming generation will not, under such training, think manual labor a task to be slighted, a drudgery to be avoided, but hoidly work shall be the handmaid of mental labor, the veritable goddess of hope, instead of the last resort of despair.

Smelting Notes From Chihuahua, Mexico.

(CONCLUDED FROM OUR LAST.)

In Treating Some Ores

("San Francisco del Oro" mine, for instance), which carry heavy amounts of zinc-blende, a loss of 25 per cent of the litharge charge occurs. This material is brought from a distance, and costs, laid down at the works, \$42 per ton. As equal amounts of litharge and ore are charged into the furnace this loss augments the cost of smelting \$10.50 per ton, which, added to the \$6.80 above, brings the total up to \$17.30 per ton. Probably the expenses for motive power, preparation of ore, and general outlays connected with the works, will increase these figures to \$18.50, exclusive of refining, i. e., when treating "black jack" ores. From data obtained at another smaller establishment, when galena ores were formerly operated upon, the total cost of smelting, per ton, summed up as follows:

Labor.....	\$2 80
Fuel.....	5 20
Motive power.....	2 00
Total.....	\$10 00

Both of these estimates are rather crude. The cost of repairs on furnaces is not included, neither are any of the little expenses incidental to metallurgical operations of this kind. But the main items, fuel and labor, are sufficiently near for practical purposes, and the fact is made clear, that in these little shaft furnaces, to construct which costs a merely nominal sum, very refractory sulphuretted ores are successfully smelted without preliminary roasting, at a cost of from \$8 to \$10 per ton. Where almost pure zinc-blende is treated, and a heavy loss in the fluxing litharge occurs, these figures are doubled. When a moderate amount of galena is present in the ore, the litharge constantly accumulates, and is sold. A knowledge of these facts would often help our Western prospectors in developing their claims, where they now sit idly by awaiting the often tardy advent of capital. The nature of the material from which these furnaces are built does not admit of long campaigns; usually they last but ten or twelve days.

Cupellation hearths, built also of adobes, are used to refine the base bullion produced by the

shaft furnaces. These are very simple in construction, requiring only a few adobes, some ashes, and clay.

Cost of Constructing One Pair of Cupellation Hearths.

Adobes for tests:	
1800 pounds for two furnaces.....	\$1 00
Labor used in construction:	
1 man, one day, at 80 cents.....	\$0 80
3 men, one day, at 40 cents.....	1 20
	\$2 00
Labor putting in tests:	
1 man at 80 cents.....	80
3 men at 40 cents.....	1 20
	\$2 00
Clay for tests:	
600 pounds.....	80
200 adobes.....	1 00
Total.....	\$8 00

The adobes which serve as roofing are somewhat larger than the others, being 30 inches by 12 inches and 3½ inches thick. They are made from selected clay, and dried under cover so as not to show sun-cracks; they stand four weeks. The tests are made of ashes taken from the ash-pit of the furnace itself, and mixed with sifted clay, in the proportion of 3 parts (by measure) of the former to 1 part of the latter. Oak wood ashes are preferred, as they do not cut out so readily, and the tests are tamped in, very solid wooden poles being used for this purpose. The furnace, when complete, occupies a space 5 feet wide by 5 feet high and 8 feet long, the test holding about 750 pounds of base bullion and matte. The matte, which forms in a thin cake upon the surface of the lead, when tapped from the shaft furnace, is thrown in upon the bath while refining, and runs down with it. This dissolving of the metallic oxides in the litharge constitutes the main expense of the operation, consuming much time and fuel. Six marks of silver, at eight ounces, result from cupelling 1,500 pounds of a mixed charge of lead and matte, the whole operation lasting twelve hours. Oak wood is used as fuel, costing 20 cents per 200 pounds. A test of this description requires to be built every month, slight repairs being necessary after every charge.

Cost of Refining 3,000 Pounds of Lead and Matte.

One day's run:	
Two refiners at 60 cents.....	\$1 20
Fuel, 1,500 pounds oak.....	1 80
Labor.....	50
Materials used in repairs.....	10
Total.....	\$3 00

This estimate for fuel is rather low, and it might be well to add \$1.20 to the above figures, so as to include surplus fuel, rebuilding, blast and other incidental expenses. Still, then, we have the astonishingly low result of \$4.80 for 3,000 pounds, or \$3.20 per ton. The loss in lead during this operation amounts to 11 per cent. The silver obtained is melted down in a furnace similar to those used throughout our Western country for a like purpose, but built of adobes. In the place of costly graphite crucibles, old quicksilver flasks are made use of in this melting, a flask lasting for fifteen to twenty bars, according to the strength of the welding. The bars are not allowed to contain over 1,080 ounces, and by using two flasks and one furnace twenty can be cast in one day. Pine coal is used in the melting furnace. The bar silver runs from .970 to .980 fine.

The ore, heavy in zinc, is partially roasted in kilns at the mines before being brought to the smelters. These kilns are 10 feet high, 12 feet long, and four feet broad. On the bottom are two air canals, covered with pieces of strap-iron set on edge, which act as grate-bars. On these wood is piled a foot high, which, in turn, is covered with ore, about 15 tons, until the kiln is two-thirds full. One other layer of wood having been thrown in about the middle of the charge, the front of the kiln is sealed up and the charge fired. The exit for the fumes is quite small, in order to limit the access of air from below. The ore loses about 10 per cent of its weight during this operation, which is represented to cost 22 cents per ton. The oak wood used is approximately 2 per cent to 4 per cent of weight of the ore charged, and costs \$2.20 per cord.

The Entire Cost

Of the roasting, smelting and refining operations to which this rebellious ore is subjected, sums up to, approximately, \$20 per ton, the product being bar silver, .980 fine.

The system is characterized by two features, the small quantity of material it is possible to operate upon, and the consequent waste of time; it has, therefore, little to commend it, except for operations on an experimental scale. It owes its success mainly to cheap fuel and labor, but both of these commodities are limited, and prevent extended operations. Lead is sacrificed because of the absence of iron; still, when we consider the quality of the material treated, the small amount of lead ore mixed with zinc-blende and antimonial and arsenical compounds, the result is very creditable. At one small works I found them working the blast by man power, the whole concern being of home manufacture, bellows, furnace, and all. I am indebted to Messrs. Beckman & Stork, of Santa Barbara, for much of the metallurgical information contained in the above.

THE snow-sheds on the Central Pacific road, despite the efforts of the company to clear them, are, many miles of them, covered with snow from six to twelve feet deep, and are liable to yield under the enormous pressure.

The New Gold Amalgamator.

In the *Transcript* of Wednesday last was made mention of a new gold saving machine being exhibited in this camp. Yesterday we received a call from Messrs. Irvin & Campbell, the inventors, from whom was obtained a detailed account of its workings. It is an invention for saving the fine gold and flour quicksilver generally carried off in the tailings from gold mines of all descriptions and proving a total loss. This is a matter which has puzzled the brain of the miner and scientist for years, and although many machines have been invented heretofore none of them have succeeded, so far as we know, in doing the work they were intended to. Only the coarsest and heaviest gold has been caught and held in the quicksilver, the float and flour gold passing off with the water and sand. As fine gold composes the major portion in many mines, it has been the desire of miners to secure some process that would stop this leakage and enhance the value of their properties. Messrs. Irvin & Campbell have been exhibiting their machine through the mining districts of Oregon and California since the early part of last October, and we are informed it has given general satisfaction wherever operated. It is simple in construction and easily managed. The pulp or tailings are passed into a hopper and thence down through a U crook in which is deposited from two to ten pounds of quicksilver, according to the size of the machine required. Thence it passes up into a cast iron box in which is placed a perforated amalgamating plate. At this juncture the quicksilver is returned and the pulp passes into the overflow and is cast off. By the peculiar construction of the gold-box there are eddies and under-currents made, which assist materially in retaining the precious metal. To a casual observer it appears simply wonderful in regard to its ability to retain the amalgam and pass off the debris and sand.

The principle appears to us to be correct, and we do not see how a particle of gold can escape after passing through so large a body of confined quicksilver. If the machine will accomplish all that is claimed for it, it will bring about a revolution in the mining business, as it is quite simple and comparatively inexpensive. The inventors are giving the mining public every opportunity to see it in operation and carefully scrutinize its workings. They invite the severest tests by expert miners. They go from here to-day to Grass Valley, where they will remain a few days. —*Nevada Transcript*.

Fluorspar.

Fluorspar is found in more or less quantity in almost every State and Territory, but not very frequently in workable amount. No statistics of production are accessible, and the estimates of dealers vary widely; but the amount annually mined is very considerable, possibly reaching 5,000 net tons per annum. Fluorspar is used as a flux and as a glaze in the pottery trade, and in the production of hydrofluoric acid for etching. The greater part consumed in this country is from home sources, little now being imported; and the domestic mineral is reported to be superior. Its spot value ranges from \$10 to \$20 per ton. Indiana and Ohio are said to lead in point of production. New York, Delaware, New Hampshire, and Kentucky also contain fluorspar in noteworthy amount.

Fluorspar in the Rocky Mountain Region.

Fluorspar occurs massive in wide metalliferous veins near Bear creek, in Jefferson county, and on James creek, Boulder county, Colorado. The white, green, pink, and purple colors are common, and often all these colors occur in a single specimen. The mines at Bear creek have produced some 600 tons of fluorspar, which was sold to the Boston and Colorado Smelting Works at Black Hawk before they were removed to Argo. The supply from this point is exhausted. On James creek the veins of fluorspar are undeveloped, as there is no demand for it as a flux. Fluorspar occurs frequently in the ores of Montana, Wyoming, Colorado, and New Mexico, but only in small quantities. It is used as a flux in local smelting operations, but is not much in demand. Fine cabinet specimens come from Crystal Park, El Paso county, some showing crystals 10 inches across.

URANIUM.—Uranium in the form of the mineral pitchblende (uraninite or gummite) occurs in Jefferson and Gilpin counties, Colorado. In Jefferson county thin seams of it have been found, but the mineral is in too small quantity to be economically valuable.

In sinking the shaft on the Wood lode at Central City, Colorado, in 1872, a lenticular mass of pitchblende was cut through and quite a large quantity of it was thrown away before its character and value were known. Afterward the remainder, amounting in all to three tons was extracted under lease by Richard Pearce, Esq., of the Boston and Colorado smelter, and was sold in England at an average price of \$1.50 per pound. The mineral was quite pure, and averaged 70 per cent of the proto-sesquioxide of uranium.

Uranium is used in considerable quantities in chemical operations and in porcelain painting, affording a yellow or black color, according to the process of baking. The principle supply is obtained from the mines at Joachimsthal, Bohemia, and is quite limited.

USEFUL INFORMATION

Peanut Flour.

No doubt ere long "peanut flour" will be an important product of the South. Virginia is set down this year for 2,100,000 bushels, Tennessee for 250,000, and North Carolina at 135,000 bushels, these being the chief States engaged in their cultivation, and those in which it was first introduced from Africa. In Virginia they are called "peanuts," in North Carolina "ground peas," in Tennessee "goolbers," and in Georgia, Alabama and Mississippi "pinders." Virginians are beginning to turn the peanut into flour, and say it makes a palatable "biscuit." In Georgia there is a custom, now growing old, of grinding or pounding the shelled peanuts and turning them into pastry, which has some resemblance, both in looks and taste, to that made of cocoanut, but the peanut pastry is more oily and richer, and, we think, healthier and better every way. If, as some people believe, Africa sent a curse to America in slavery, she certainly conferred upon her a blessing in the universally popular peanut, which grows so well throughout the Southern regions that we shall soon be able to cut off the now large importation altogether. —*Savannah Telegram*.

BOMBAY MORE CROWDED THAN LONDON.

One of the results of the Indian census, the various returns of which are now being collated, is to show that Bombay, the second city in the British Empire, is more crowded than London itself. The density of population in London in the most densely peopled parts is less than the density of twelve of the most crowded sections of Bombay, with a population of more than 430,000 people. These sections have an average population of 458.57 per acre. In Bombay the average of population is about 52 per acre; in London 49. The extreme in London rises to 222 per acre, whereas in Bombay it rises to 759. The population of the sections in which the crowding is double that of the most crowded divisions of London is equal to more than 37 per cent of the total population, but the area of these sections is only 3½ per cent of the island. In other words, 37 per cent of the population are crowded upon 3½ per cent of the surface of the land.

LOOK ON THE BRIGHT SIDE.—"It is better for all to cherish a feeling of hopefulness," says the *Industrial World*. "It is more natural to indulge in cheerful than in desponding predictions. Many who are closely scanning the future discern numerous encouraging signs. The wonder is that there are not more who do so. When we come to think of the magnitude of the country, the diversity of the wants of the people, the wealth of the nation and the facilities we have for commerce and manufacturing, it is not surprising that the intelligent observer should see a how of promise in the future. As surely as the morrow's sun shall rise, so surely will prosperity return to the country. The time of this return may be much nearer than many anticipate. This being true, how idle is it to continue in predictions of evil, especially since such predictions are promotive of the evils feared."

PRESSURE OF THE SEA.—If a piece of wood which floats on the water be forced down to a very great depth in the sea, the pressure of the surrounding liquid will be so severe that a quantity of water will be so forced into the pores of the wood, and so increase its weight that it will be no longer capable of floating or rising to the surface. Hence the timbers of ships, which have foundered in a deep part of the ocean, never rise again to the surface like those which are sunk near the shore. A diver may, with impunity, go to a certain depth in the sea; but there is a limit, beyond which he is subject to danger. For the same reason it is probable that there is a depth below which fishes cannot live. They have, according to Joshlin, been caught in a depth at which they must have sustained a pressure of eighty tons to each square foot of their bodies.

ROUGH ON ENGLISH CARS.—The London *Engineer* says of some of the passenger cars on the Southeastern Railway, that "they are square, low-ceilinged, cornered everywhere, cold, straight, draughty, noisy, wandering, vibrating, stuffy, dirty, dark, dingy, creaking, loose-windowed, worn-out, dangerous old coaches; and plenty of the Southwestern stock is nearly as bad." In addition to all this badness, Colonel Rich, one of the Board of Trade inspectors, "observed that the London & Southwestern Railway Co.'s gauge for the wheels of the rolling stock is about one sixteenth inch to one thirty-second inch wider than the permanent-way-gauge, which was given to him to gauge the road."

REMOVING STAINS FROM COTTON OR LINEN GOODS, CURTAINS, ETC.—Grease spots are best removed by soap; stains from oil colors, as a rule, do not resist the action of a mixture of soap and caustic potash. If spots of tar or axle grease are unaffected by soap, they will usually yield to the solvent action of benzine (so-called), ordinarily ether, or of butter, which may afterward be removed with soap and water. For ink stains, diluted hydrochloric acid, which must subsequently be carefully washed out, will

generally be found effectual. For the same purpose oxalic acid or salts of sorrel (hydrogen potassium oxalate) may also be employed, and that most economically, in fine powder to be sprinkled over the stains and moistened with boiling water. The action of these solvents may be hastened by gently rubbing, or still better, by placing the stained portion of the fabric in contact with metallic tin. If there is much iron rust to be removed, Dyer's tin salt (stannous chloride) will perform the work at less expense than the oxalic acid compound. Another solvent for such stains consists of a mixture of two parts argol with one part powdered alum. Stains caused by red wine, white wine, and fruit juices in general are treated successfully with salts of sorrel or with a solution of hypochlorite of soda. The latter especially must be carefully removed when the ends have been attained. Another well-tried plan, when space is available, is to spread the stained fabric on the ground in the open air, smear the spots with soap, and sprinkle ground potash or common salt upon them. Water is added and replaced when lost by evaporation. After two or three hours' exposure the whole fabric may be washed, and will be usually freed from its stains. —*Industrial Record*.

NEW GRAIN TESTER.—To satisfactorily test the contents of a grain sack, without the necessity of emptying it, Nobbe's proving staff is offered, by means of which samples from any desired part of a grain filled sack can be quickly obtained. The staff is placed in the grain, and by revolving the outside layer three divisions (upper, middle and lower) are thrown open. The instrument being now shaken, grain falls into the openings, and the staff being withdrawn from the sack, may be easily examined. —*Muelter Zeitung*.

NO MORE BELL CORDS.—It is said that the Pennsylvania railroad is experimenting with a device intended to supersede that most aggravating and inefficient affair, the bell-cord. The improvement communicates by air pressure, with a small whistle in the locomotive cab, and the condenser signals by a small button, near the car door.

TO DISSOLVE AMBER FOR VARNISH.—Amber is soluble in sulphuric acid and in pure alkalies. In making varnish amber is generally brought into solution by heating it, then adding the oil, and finally stirring in turpentine as it cools.

TO REMOVE INDIA INK.—Blister the part with a plaster a little larger than the mark; then keep the place open with an ointment for a week; finally dress it to get well. As the new skin grows the tattoo will disappear.

WEIGHT OF A CROWD.—A densely packed crowd of human beings will average about 65 pounds weight to a square foot.

GOOD HEALTH.

Health of Cities.

Longevity and premature decay are doubtless influenced by the food and general habits of the people, and by temperature and other local atmospheric conditions, although all these may be largely modified and brought under control by attention to sanitary laws and appliances. Artificial atmospheres are, in fact, created in large cities according to the character of the building, the air space allotted in them to each inmate, and the mode of ventilation and warming, as well as by the width of the streets, the sewerage, and other sanitary arrangements. Moreover, the hereditary constitutions of the citizens become in after generations affected by the condition of the cities in which they and their forefathers have lived.

The facts and figures before us point to many of the causes for so great a variation in the death rate as has been shown to exist in different cities. A high death rate will in most cases be found to be the companion of defective house accommodation, ventilation, water supply, sewerage, or scavenging. Thus, for instance, St. Petersburg, with a population of nearly a million, and the high death rate of 35.2 per 1,000, is without sewerage, and its water supply is taken from the river Neva, more or less contaminated by the percolation from the subsoil. Cairo, with a death rate of 37 per 1,000, is supplied with water from the Nile, having no sewers, and the sewerage filtering through the subsoil into the Nile above the water intake. Vienna, with a death rate of 29.2 per 1,000, has an average of 60 people in each house, or twice as many as in Paris, while the ratable value of the houses in Vienna is only one-sixth more than those in Paris. Pekin, with a death rate of 50 per 1,000, is without proper sewerage, water supply, street cleansing, or other proper sanitary arrangements.

SUGAR AS A DRESSING FOR WOUNDS.—Dr. F. Fisher, writing in the *Centralblatt für Chirurgie*, says that in the Strassburg Hospital, where he is assistant in the surgical department, Professor Lucke has since May used powdered cane-sugar as an antiseptic dressing to wounds. Hitherto it has been used in combination with naphthalin (equal parts) or with iodoform (one part to five of sugar). In cases of wounds united by suture the mixture is put up in gauze and applied to the part; where there is loss of skin, the sugar

is sprinkled over the part. The sugar-dressing is fixed in place by some layers of gauze deprived of fat, over which a layer of gutta-serena is applied, and the whole is secured by a bandage. The sugar-dressing may remain from eight to fourteen days without the sugar dissolving; the secretion from the wound is equally distributed through the sugar, and it is only when the layer of sugar is too thick (more than one-fifth of an inch) that lumps are formed. The wounds have a healthy appearance under the sugar, the dressings are not offensive, and bacteria cannot be found in them. Healthy granulations, with no tendency to bleed, are developed, and cicatrization proceeds rapidly. In wounds united by suture, healing by the first intention has always been observed. Dr. Fisher is not able to say whether the sugar is decomposed, or what new products are formed.

BEEF JUICE VS. BEEF TEA.—Prof. Roberts Bartholow, of the Jefferson Medical College, says: "Nothing has been more conclusively shown than that beef tea is not a food. It is nothing more than a stimulant. The chemical composition of beef tea closely resembles that of urine, and it is more an excrementitious substance than a food. Beef juice is quite a different thing, and quite nutritious." It may be prepared as follows: "The lean part of the beef should be selected. This should be cut into thick pieces about the size of a lemon squeezer. The pieces should be next placed upon a hot coal fire for a moment, to sear the exterior; the meat is then transferred to the lemon-squeezer, which has been warmed by dipping in hot water, and the juice pressed out and allowed to flow into the glass, which has also been heated. The juice is seasoned with a little salt and Cayenne pepper, if the patient desires it, and taken immediately. In this way the nutritious elements of the meat are obtained, and the slight scorching develops constituents which give the peculiar flavor to cooked meat." This is for a diet, the principle of which is the administration of those elements which are disposed of in the stomach, and do not require the aid of the intestines in their digestion.

SNAKE BITES AND HYDROPHOBIA.—In a recent lecture in New York, Dr. Woodbridge said: "In case of a bite of a venomous serpent, the old historic method of sucking the wound with the lips is one of the first things to be resorted to. If the poison is in the circulation, the use of strong brandy or whiskey, in quantities powerful enough to produce intoxication, must be resorted to. The bite of a mad dog should be cauterized at once, by a pencil of lunar caustic or by application of irons heated white. The peculiarity of hydrophobia poison is that it remains in the spot where the bite occurs for several days or weeks, and not until the poison ferments does it become dangerous. Dr. Hewett, a surgeon of London, allowed himself to be bitten no less than eighty times by rabid dogs, each time successfully cauterizing the wound. He fell a victim to his temerity, however, for one day he was found dead with a pistol shot from his own hand. A statement was left in his papers that he had neglected the cauterization too long, and feeling the first symptoms of hydrophobia, he preferred to die without the long agony."

THE USE OF MILK.—The consumption of milk is very much less than it might and should be. One quart of milk contains quite as much nutriment as one pound of average beef, and costs half as much money. Farmers use comparatively little milk, and much less than they could very profitably. Milk and crackers or bread—when it is sweet—make a most wholesome and nutritious food, and if used regularly for one meal every day would be found far more desirable and satisfactory than any other food. The average consumption of a family who purchase their milk is not more than one pint per day, and the majority of farmers use milk only in tea and coffee and rarely as food. Two or three quarts of milk a day might be used in every family with great benefit and economy. With crackers, bread, rice, sage or tapioca, it makes the most delicious puddings, and when sipped slowly while one is eating a cracker or a biscuit it makes a light supper, which will encourage restful sleep at all seasons, but especially in the warm weather. —*New York Times*.

LENGTH OF LIFE INCREASING.—Dio Lewis thinks that before the year 2,000, centenarians will be very common, and even diamond weddings not very rare. He bases his belief on the fact that during the first six months of the present year 509 persons died in Philadelphia who had lived to or beyond the age of 80, against 489 in 1882, and 449 in 1881. Moreover, he tells us that in 1816 the average length of life in Boston was 21 years; in 1874, 42 years.

PROMPT CURE OF RINGWORM.—R. W. Taylor, M. D., in the *Journal of Cutaneous Diseases*, reports the best results from the use of a paint composed of a tincture of myrrh and four grains to the ounce of bichloride of mercury. Other skin affections are cured by the application of this remedy.

TO PREVENT LEAD POISONING.—Freedom from the risk of lead-poisoning by using glazed earthenware is said to be secured from varnishing the glazed surface with borosilicate of lime.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

DOYLE.—Amador Ledger, March 6: D. H. Sawyer, owner of the Doyle claim who went East last fall for the purpose of enlisting capitalists in the development of the mineral resources of the county returned to Jackson Friday evening of last week. He is going to have a test crushing of ore from the Doyle claim as soon as the Kelly mill can be secured for that purpose. He says, when the paying character of the rock is demonstrated by actual mill process, he will have no trouble in raising all the money necessary to the proper development of the mine. The rock in the face of the big tunnel at Middle Bar, which has been extremely hard for several weeks past, changed a few days ago to a softer formation, consequently the work is progressing more rapidly.

Inyo.

ATTACHMENT RELEASED.—Inyo Independent, March 8: The attachment on the Argus Range Silver Mining Company for a small, and it is said illegal claim, has been released. It is understood that the mill will start up again in a few days on very rich ore, of which there is now 300 tons on the dump and plenty more in sight. The prospects of this company are among the brightest in the county. Edward Reilly and Dr. A. H. Whittell, two of the principal owners, are now with us. They propose to put the affairs of the company in good shape and on a satisfactory financial basis.

ATTRACTING ATTENTION.—In our short visit to Hawthorne and way points this week we heard much talk of the mines of this county, especially at Darwin, and met many old Inyoites who were firm in the belief that this was the coming country. From all quarters comes the information that Inyo is attracting more attention than any other county in California just now.

Mariposa.

COULTERVILLE.—Cor. Mariposa Herald, Mar. 6: The mining interests are not so flattering as we would like, yet we have some of the best mines in the State, and it is only a matter of time as there is no doubt that our mines will be worked. Those that are now being worked are yielding good results. I understand that the Virginia mine is showing up some good rock. They are nearing a fine chute of ore in the upper tunnel, and it is expected that when they get fairly into the vein that the mill will start up, when they will be able to keep the mill running on first-class ore. The Red Cloud mine is running, but with what success I am not informed. The Bandierita and Compromise mines are both working a large number of men on dead work, and as a consequence the mills are standing idle. Since an abundance of water has fallen John L. Scanlon has been doing a good business placer mining on the North Fork, where he has one of the best mines in the county and as good as can be found in any other county in the State. He has his mine well equipped with every appliance for cheap working and must, about this time, be rolling out the yellow dust in satisfactory quantities. God speed, I say, he deserves it. A new quartz mill is being built on Black creek about one-fourth of a mile from Coulterville by Andrew Goss & Co. It is going up with magic speed. It was only commenced about ten days ago and is now almost completed. Of course it is a small mill, but it is a quartz mill.

Mono.

JORDAN DISTRICT.—Bodie Free Press, March 8: S. O. Johnson has been working like a Trojan in Jordan district for three years and it seems that his reward is near at hand. His tunnel is in 106 ft, most of the work being done by himself without assistance. He has run through an immense vein, that gives good assays, all the way across, according to Soderling's certificates.

BODIE.—Free Press, March 11: A greater number of Bodie mines are now being worked than at any time for a year past. A force of men have been employed at the Goodshaw for two weeks, and Sunday morning work was commenced at the Mono. While the Bodie tunnel mill is under lease to the Bodie Con. Company, the work of exploration is continued in that property. Syndicate, Bodie and Standard are working large forces of men, as usual, and what is more to the purpose, so far as stockholders are concerned, all three are paying dividends. The outlook for the district is indeed most flattering. The most serious difficulty with which our mining men have had to contend the past two months have been the heavy and continued snow storms, the last, which occurred Saturday and Sunday, having been the heaviest of all, and the worst one for years. It put an effectual embargo on the hauling of ore from the Bodie mine to the mills. The clear, cold weather of last evening gave promise that regular trips would be resumed to-day. The mine is now fairly choked up with ore ready for reduction, and by reference to Supt. Irwin's report published below it will be seen that rich ore is exposed in more different places in the mine than ever before—and on more levels.

BODIE CON.—The stopes on the 200 level continue to look well, and are now in shape to furnish a large quantity of good ore. The vein in the Vulcan winze is opening out beyond expectations, showing in the bottom four ft of high-grade ore. At a point 60 ft south of winze No. 1, winze No. 2 has been started, and has reached a depth of 12 ft, where the vein is two ft wide, of good ore. Upraise No. 1 on the Gliden vein has been advanced during the past week 12 ft; total height 62 ft, showing six ft of ore.

STANDARD CON.—There were extracted and shipped to the mills during the week 1330 tons of ore, and 700 ounces of crude bullion were received, which will be carried over until Monday, the 17th instant. Upraise No. 2 from south drift No. 2, 1000 foot level, is up 175 ft, showing four and a half ft of vein. The main east crosscut is being retimbered and good progress made. The west crosscut from south drift No. 1, 385-foot level, is in 20 ft, in fair working ground. They have started to drift north from the main west crosscut, west of the shaft, the drift now being in 22 ft. The south winze is down 90 ft; vein four ft wide. There is no change to note in the appearance of the stopes.

MONO.—The work of replacing the old engine and hoisting apparatus at the shaft was begun Sunday morning. When completed some earnest prospecting will be done below, in hopes of encountering a continuation of the Bodie Con. veins.

THE CHAMPION.—Superintendent White is straightening up things and preparing the mine for proper working.

GOODSHAW.—A number of men are at work on the 600-foot level. It is probable that the force will be increased as soon as the condition of the mine warrants it.

SYNDICATE.—The mill is running steadily and shipping bullion to the Carson Mint regularly. The last bar was valued at about \$7,000.

Nevada.

NORTH BLOOMFIELD.—North San Juan Times, March 6: A petition is being circulated in North Bloomfield asking the Board of Supervisors to grant an appropriation from the funds of the county for the purpose of aiding the miners carrying the Woodruff case to the Supreme Court of the United States. Said petition is meeting with a hearty approval in the community. We favor the action taken by the Bloomfielders and think that every town in the county should follow in line. About 20 men are engaged in cleaning bedrock at Malakoff. The Derby mine gives employment to about 30 men. The reported reduction of wages at the Derby proves to be false. An effort was made to reduce the pay for a day's work but the movement was put down by the employees.

MAGENTA MINE.—Grass Valley Union, March 6: Active work is going on at the Magenta in taking out quartz on the 300 and 400 levels. The quartz is of good quality, and shows well in free gold and sulphurets. The quartz taken out from these levels is done as company work, and not on tribute. A crushing of 100 tons of this quartz is now being hauled to the Rocky Bar mill, to be put through as soon as some crushings of custom rock now at the mill is disposed of. There are also some half dozen companies of tributaries at work on the croppings of the Magenta, and from several of the shafts fine rock is being taken out. Yesterday some rich quartz was taken out of the Magenta mine, on the 300 level, 65 ft north of the shaft. The rock was studded with free gold, not of a specimen character, but distributed generally through the rock, which also carried largely in sulphurets. About 400 pounds of this quality of rock was taken out, and it is believed more of the same kind is to follow.

A GOOD RESULT.—A cleanup of 73 loads of quartz from the Slate ledge mine, at Forest Springs, has just been made at Sothern's custom mill, which gave a yield of \$2,301, or about \$30.10 per load. This was the final cleanup of company rock, and gave a handsome dividend after all expenses were paid. The mine is now being operated under lease of Z. Mansau, who pays a certain royalty to the company for each ton of ore extracted and milled.

LOCAL NOTES.—Foothill Tidings, March 8: The storm has greatly interfered with some of the prospects in and around Grass Valley, but nevertheless work is being done. All of the custom mills are busy; the available dumping ground around them is covered with rock, from the different prospects, awaiting an opportunity to be put through the mill. When the weather is good all of the quartz teams are kept at work hauling quartz to these custom mills, and most teams have engagements enough to keep them running all this season. This is a healthy sign and promises a prosperous future for the district. Work is being pushed forward in the Magenta mine, and for the past two days, quartz of extraordinarily good quality has been coming from the 300 level, at about 60 ft north of the shaft. On Thursday the car was bringing ore from the 300 level, all day, and about 400 pounds of this ore was selected from the cars, and locked in the private room at the works, the ore being valuable to be allowed to remain on the dump. On Friday it was the same, the ore being very rich—better in fact than that taken out the day before. Free gold and sulphurets were plainly discernible in almost every portion of the large pieces of the rock, and could be seen with the naked eye at a good distance. The company are engaged in hauling ore to the Rocky Bar mill, where it will be crushed as soon as possible. It is intended that about 100 tons of ore from the 300 level will be put through the mill, and there is a strong probability that the mill will be kept constantly running on Magenta rock. Stopping is going on in the back, and the 300 level is being pushed forward as rapidly as possible. The contract for sinking the shaft 100 ft, for the Imperial Company will be finished about the end of next week, after which a sump will be sunk and drifting commenced. The ore in the bottom of the shaft looks well; so promising, in fact, is it that a crushing will be taken out about the end of the month. Work has been stopped in the tunnel of the Gray Hound mine, and sinking will be commenced on a very promising stringer of the ledge. A party of tributaries will do the sinking on this stringer and the ore will be crushed as soon as the mills can do it. The ore looks well. The New York Hill ground still continues to yield readily to the pick and drill. The company will commence sinking the shaft in a very short time, when new and important developments are expected. Work was resumed on the Greeley-Blackman last Tuesday, and will continue through the summer. The ledge in the tunnel is large and solid, and shows sulphurets and "Black Jack." A Sacramento company own this mine. Messrs. Bourn and Stoddard are still diligently at work soliciting subscriptions for the North Star stock. The mine will soon start up for a certainty. The Empire is looking as well, if not better than ever. A large force of men are employed and the mill is kept constantly running.

DAMAGED BY WATER.—Herald, March 9: A rush of water Sunday morning caused the Rock creek ditch to overflow and a large body of water swept down through the tunnel of Nivens' drift claim on Selby Hill, washing away a large amount of gravel from the dump. The mine was filled with water to such an extent that it will require several days to pump it out. The pay dirt washed away lodged around the boulders in the ravine below and is therefore not a total loss, although it will necessitate much extra work in order to wash it out. It is estimated that the damage done will amount to several hundred dollars. The flood came from a little ravine on the hill above, carrying with it large boulders, bushes and other debris, which dammed the ditch and caused the overflow.

Plumas.

PLUMAS EUREKA.—National, March 6: From Surveyor Kaddie we learn that on Tuesday last the workmen in the Eureka tunnel in the Plumas Eureka mine, made the connection with the work from the Mohawk tunnel. This is an important feature, as it will make a large reduction in working expenses and will bring the works, to some extent, down the mountain. The Eureka tunnel is now very nearly one mile in length. Heretofore the rock which will now go out through it, has been raised through a shaft to the Mohawk tunnel, run in some distance, and then dumped down another shaft into the Eureka tunnel. The connection spoken of will do away with all of this work, and of course, lessen expense.

LA PORTE.—The great Slickens decision has caused no very much excitement here, as it is not believed that mines here will be interfered with, inasmuch as our miners have a reservoir on Slate creek where they impound their tailings.

San Luis Obispo

SAN LUIS OBISPO GOLD MINES.—Tribune, March 8: The localities where old mining is carried on in this vicinity are at La Panza on the eastern slope of the San Jose mountains in this county, and on the ocean beach south of the mouth of the Santa Maria in Santa Barbara county. The gold mining region of the San Jose range is quite extensive, embracing the canyons of half a dozen streams.

Sierra.

RUNNING A TUNNEL.—Tribune, March 6: Two men are employed in running a tunnel at the American quartz claim, located below Goodyear's Bar, near the Mountain House road. One of the parties owning this claim resides in Oakland, and the other in the State of Nevada. The tunnel is being run with a view of striking the extension of the Brush creek vein. One of the gentlemen interested in the enterprise was in Goodyear's Bar a short time since, and expressed himself as being very well satisfied with the indications. There are some good quartz ledges around Goodyear's Bar, and it is more than likely that active steps toward developing them will be taken in the near future.

WORK SUSPENDED TEMPORARILY.—One of the pumps at the Marguerite mine gave way last week. This accident together with the fact that the supply of wood was about exhausted, lead Supt. Myers to suspend work in the shaft entirely. A large pump is now at Nevada City and a turbine water wheel at Truckee awaiting shipment to the mine. As soon as these can be hauled in and placed in working order, operations will be resumed again underground. A supply of wood will also be obtained in a short time. It is unfortunate for the owners of this mine that work is allowed to drag along in such a dilatory manner for the lack of funds at the proper time. The mine was never in a better condition than it is at present, and if the company had been a little more prompt in making arrangements for completing the improvements now under headway, the mill would be crushing at this time and yielding handsome returns. There is and always has been every evidence of a good paying property in the Marguerite mine.

Siskiyou.

ORO FINO.—Cor. Yreka Union, March 6: I learn that Mr. Campbell, our enterprising miner, has a portion of Quartz valley bonded, and is getting up an enterprise to open up that valley and all the tributaries along the western slope of the Oro Fino mountain. The proposed sluice will be some three miles in length, and will open up one of the most extensive and valuable mines in Northern California.

Trinity.

ANOTHER GOOD CLEANUP.—Trinity Journal, March 8: Moor & Day were in town this week with a fine lot of bullion from the East Fork Quartz Mine. Seventeen tons and a few hundred pounds were run through the arastra and produced something over \$2,000, of which amount 102 ounces of the bullion was shipped to San Francisco. Mr. J. L. Day informs us that of the 17 tons run in the arastra, probably one-third was earth and he is well satisfied that the actual rock crushed went from \$150 upward to the ton. East fork quartz has been proven rich, and that section will soon develop into a rich and lively district as much prospecting will be done during the spring and summer, and many new ledges be opened up.

SOLD OUT.—We learn from Mr. C. Frick, of Lewiston, that Mr. Isola has sold his interest in the quartz mine he recently discovered in Deadwood district to an Italian gentleman from San Francisco, for \$9,500, receiving \$1,000 cash down and the balance to be paid when taken from the mine. The new owner is now engaged in running a tunnel and expects to strike the lode in about 20 ft more. If found as good as on top, it will be one of the largest and richest mines in the country.

DEADWOOD DISTRICT.—Cor. Trinity Journal, March 8: I first visited the Black Bear Mine owned by Messrs. Gibson and find a 1000 ft tunnel run on the vein in the center of which a shaft is sunk to the depth of about 70 ft, making the total depth from the surface on the vein a little less than 400 ft. It is astonishing to think of the amount of bullion this little mine has turned out since its discovery. Richard Killin, the discoverer, first sold the prospect to Frick & Davis, who, having made developments and realizing a very handsome dividend, sold the property to Gibson Bros., who are at present pushing it ahead with prospects as good as ever. McDonald Bros. have a splendid mine, the ledge varying from one to two ft in width, and the rock calculated to go over \$100 per ton. They intend crushing part of their rock in the new arastra recently put up by John Gibson. Frick & Davis have started up again after a short sleep through the holidays. They are getting rich rock as such has been the case ever since its discovery. Their new arastra is completed and in operation. Grayson & Lambeth, I believe, still continue, as the old stamps make the usual noise and the whistle whistles its daily tune. William Lappin, "Deadwood's favorite," has a three-foot ledge of good paying ore. James Kelly has shut down on his mine for the present, having out sufficient rock for the season.

"Volunteer."

GOLD IN THE STREETS.—Union Democrat, March 8: Charley Lang picked up a chispa weighing eleven dollars on the street Wednesday, and a young man picked up another, containing two or three dollars,

in front of Jake Binder's Thursday. Can it be said that our mines are exhausted when gold can be picked up in the streets? The work of erecting the roller crushing mill at the Pampa Hill mine, near Rawhide, is rapidly progressing. The mill will be ready for operation in a week or so. There is about a hundred tons of very fine quartz on the dump at the mine.

NEVADA.

Washoe District.

GOULD AND CURRY.—Enterprise, March 8: They put in the "station set," and have since sunk five or six ft below the 2700 level. They will sink about 15 or 20 ft below this level before opening the 2700 station, as a drift will not be started until there is sump room, and until a donkey pump is in place at the station. They will be ready some time next week to begin excavating the 2700 station. At the Bonner shaft the north drift on the 1200 level has been cleaned out and repaired a distance of 130 ft. The drift was found to be caved full, and the work of cleaning out and retimbering has been slow.

SIERRA NEVADA.—The joint Mexican and Union Con. airway on the 2900 level has been completed, and is found to work exceedingly well. It completely changes the course of the heated air that ascends from the 3100 level. Doors are now being put in to regulate the circulation of the cold air from above in the Sierra Nevada ground on the 2900 level.

SAVAGE.—The north drift on the 2600 level is out 85 ft north of the north line of the Hale and Norcross. Yesterday morning a blast in the face of the drift let in about 25 inches of water, and work at that point has been temporarily suspended. Yesterday afternoon the flow appeared to be slackening off somewhat. This water flows out through the 2600 level to the Combination shaft, and kept the pumps very busy all day yesterday.

MEXICAN.—The airway on the 2900 level, joint with Sierra Nevada and Union Con. is completed, and works well. It completely changes the course of the heated air ascending from the 3100 level.

UNION CON.—On the 2900 level the airway joint with Sierra Nevada and Mexican is completed, and is found to do excellent work, completely changing the course of the current of heated air coming up from the 3100 level. On the 3100 level the diamond drill is still at work from the face of No. 1 crosscut, and is showing a decrease of water. No. 2 crosscut on this level shows some water.

HALE AND NORCROSS.—Good progress is making in the southeast drift on the 2800 level. It was yesterday out 70 ft. It is cutting alternate streaks of porphyry and clay slips. There is no trouble in the drift on account of water. The water from the Savage, yesterday morning, was turned aside by a small dam and made to flow through the main cast drift on the 2600 to the Combination shaft.

YELLOW JACKET.—A full force of men is now at work in the mine, and the mills on the Carson river are running to their full capacity. A great amount of ore has been opened up, and there are likely to be no more stoppages for some months. Greater care is now being exercised in the assorting of ore, and only experienced men are allowed to do that work.

BELCHER.—A full force of men is employed in the mine, and all the ore that the mills on the Carson river are able to reduce is being taken out. A large amount of ore has been opened up in the mine at several points by exploring drifts and crosscuts; also, a good deal of material that will pay is being found in the old fillings.

CROWN POINT.—Are again at work with a full force of miners. There is now an abundance of water in the Carson river, and the mills will be able to run steadily for some months—until the water falls next fall.

CALIFORNIA.—The work of enlarging the station at the 2700 level, for the purpose of putting in a double hoisting engine, is fast approaching completion.

COMBINATION SHAFT.—The shaft is several ft below the 280 level. Delay was occasioned yesterday on account of the water coming in from the Savage, but it was expected that the men would be able to again get to work in the bottom of the shaft last night or early this morning.

ALTA.—Good progress continues to be made in the main east drift on the 2150 level; as also is the west drift on the same level. All the pumping and other machinery is working well and smoothly.

CON. VIRGINIA.—Good progress is making in the work of enlarging the station at the 2700 level, at which point a double hoisting engine will be set up.

SUTRO TUNNEL.—Following is the report of progress and details of work in the Sutro tunnel from February 22 to March 8: Main tunnel—Since last report the repairmen have been employed on repairs at the following points: Between 14,400 and 14,500 have taken out nine posts and five caps of old timbers, squared round, removed loose rock and placed in position 11 posts and five caps of new timber. Between 14,000 and 14,100 have removed three posts and one cap of old timber, and put up nine posts and three cap of old timber, also, lagged and blocked new sets where required. Between the 14,700 and 15,300 made repairs to track. Between 15,300 and 15,400 lagged behind old sets. Between 16,200 and 16,300 cleaned up debris, lagged behind sets, and put up one post and one cap. At point 200 lagged behind old sets and put up one new cap. Between point 14,400 and 14,600 placed 125 new covers on drain boxes, and west of 15,000 189 new covers. North Lateral—Since last report the sub-drain has been excavated a distance of 120 ft, and six boxes, each 20 ft long, placed therein, also, 120 ft of track relaid with new rails. North of C and C. connection 200 ft of trestle's supporting drain boxes have been repaired, and some new ones made and put up.

Bernice District.

G. W. Bothwell and family came in Saturday from Bernice on Davis' fast freight line, bringing three bars of bullion valued at \$5,000. Mr. Bothwell says the mill has been put in first-class order, and with plenty of ore on hand the shipments will be more regular in future.

Bristol District.

IN CAMP.—Pioche Record, March 8: Quite a number of Italian coalburners and woodchoppers

are in camp, that are anxiously awaiting the disappearance of the snow from off the hills, so that they can go to work at their several vocations. Foreman Richard Walsli had an extension of 12 ft put on the smokestack of the furnace on Wednesday. This is supposed to draw to a certain extent the dense fumes from around the feed holes.

Belmont District.

BELMONT.—*Courier*, March 8: We are running on foot wall of south ledge on 200-foot level. Have not taken out any of the ledge this week, but making good progress with the drift. Stopes producing the usual amount of good average milling ore.

Columbus District.

MOUNT DIABLO.—*Candelaria True Fixture*, March 8: During the week winze No. 5 has been sunk to 10 ft; its total depth is 87 ft. Winze No. 6 has been sunk 15 ft, making a total depth of 61 ft. The south crosscut, from the shaft on the third level, has reached a length of 380 ft without finding anything of value. There is a small streak of very low grade ore near the face of the crosscut. Work has been stopped here for the present and the men put to work sinking the incline. The south crosscut from the east drift on the second level is in 40 ft, and shows a small spot of ore.

SILVER KEY.—This is the name of a claim owned by Johnny Leidy and situated about two and one-half miles east of the Mount Diablo mine, on the eastern end of the chloride belt. It was originally located by him and has been developed by a tunnel, which has been run a distance of 40 ft. At this point the ledge was cut, and shows a width of from 12 to 14 inches.

COLUMBUS CON.—The usual amount of work is being done on the third level. The west drift from main drift on the third level has been extended to 10 ft, with no material change in the character of the rock.

Eureka District.

A SPRING BOOM.—*Eureka Sentinel*, March 6: There are so many small mines in this district where ore is being piled up which cannot, at present, be sent to the furnaces, on account of the continued snow-blockade; that when the roads and trails are opened, the furnaces now running will be taxed beyond their full capacity; and as the ore reserves at the Eureka Con. and Richmond mines have increased lately, it is probable that additional furnaces will be started up. It is not unlikely that spring will open this year with a boom.

Jefferson District.

CORA D.—*Belmont Courier*, March 8: Since report of February 25th, have made good progress. Tunnel No. 1 is producing the usual amount of high grade ore; will connect with stope incline No. 2 in a few feet. On the 3d instant made a valuable strike between inclines Nos. 1 and 2; the ledge is seven inches thick and stripped for nine ft; shows red chloride, horn silver and free gold, and is very rich. Have broken ground for incline about 200 ft to left of incline No. 1; quartz shows a good ore.

Taylor District.

SHUT DOWN.—*Cor. White Pine News*, March 8: Both the Monitor and Argus mills are closed down, but the managers of both are getting ready to make an early start as soon as the weather will permit. The Monitor people are putting up a whim on their main shaft, which must prove a great saving of labor. Last summer they had to hoist their ore by windlass, and they paid \$4 per day to the men at the crank as well as to all others in their employ. Robert Briggs is superintending at the mines, while Mr. Lyons takes a much-needed rest, having been in harness so long that he deems a vacation necessary for his health.

White Cloud District.

COBALT.—*Silver State*, March 10: George Lovelock, the indefatigable prospector, is developing a cobalt mine at White Cloud district, which contains ore that carry as high as 45 per cent of the metal. Mr. Lovelock was also the discoverer of the Cottonwood nickel mines.

Tuscarora District.

A FINE PROSPECT.—*Times-Review*, March 8: Joseph McGowan has recently struck a fine prospect in the Paymaster claim in a shaft sunk about 750 ft south from the Navajo hoisting works. He struck the ledge about 30 ft from the surface, on which he has run an incline ten ft. At that depth the ledge is fully four ft in width with a vein of milling ore nearly two ft in thickness, which he thinks will average from \$700 to \$800 per ton. Specimens of the ore contain the very unusual variety of native, wire and ruby silver, with free gold, all visible to the naked eye. The ore vein is widened uniformly from the shaft, and if it increases proportionately ten or fifteen ft further, it will develop to the entire width of the ledge. It is certainly a most favorable prospect at present. Mr. McGowan located the ground in 1875, and has done considerable work upon it since that time. He is the sole owner, and if the find develops to the proportions which present appearances indicate, he will reap a rich reward for his perseverance and industry. The ore is mostly green and yellow chloride. Preparations are being made for active prosecution of work in the further development of the property.

THE DIANA.—The Diana Co. has levied an assessment of 10 cents per share. We infer from this action upon the part of the company, that active operations are to be renewed in the mine. It has been a matter of wonderment to the people of Tuscarora why this mine has been permitted to remain idle so long, as the ground is most favorably located, with a strong and well defined ledge and every indication favorable for the early development of a valuable property.

ARIZONA.

LIME AND MARBLE.—*Cor. Phoenix Herald*: A new discovery has recently been made which will be of considerable benefit to this valley. A party consisting of A. B. Wiley and others have located some fine lime ledges, about 30 miles north of Phoenix, which are of extra quality. The rock—or marble which it really is—is found in ledge form, and is carbonate of lime. The ledges are from two to four ft in width, and are very clear and white. There are

many tons in sight, and it is thought by judges who have examined the lime burned from the rock, to be as good as the best California lime. Wood and water are handy, and the owners will begin next week to burn lime for this market. This is a very important enterprise, and will add another industry to Maricopa county, as there will be a great demand for lime in the near future, and we believe this will lead to another round in the ladder, for from these same ledges of marble can be manufactured the very finest of grave stones, and marble slabs for other purposes, for this is a very fine quality of white marble, easily cut, and will polish nicely.

COLORADO.

NOTES.—*Georgetown Courier*, March 6: The Knickerbocker mill at Empire has at last started up. It commenced work last Tuesday, under the management of Messrs. Harrett and Fletcher. The main shaft of the terrible mine is to be sunk 70 ft deeper. The contract has been let and the work begun this week. The shaft is now down over 900 ft. Dennis O'Fallen last week made a good strike in his Royal Oak lode, in Cascade district. He opened up a large body of ore which will no doubt pay him well. Mr. Old informs us, that the heading of his Victoria tunnel, at Brownville, was advanced 50 ft during last month, making the total length of this work on the 1st inst. 425 1/4 ft. A number of mines now lying comparatively idle, will be worked extensively the coming season. The outlook for a prosperous summer is good. We sincerely hope that the "signs of the times" are not deceptive. There was taken from the main shaft of the Mendota mine, in sinking five ft, over 21 tons of ore, net, which returned a value for silver and lead of \$2,076. Eight tons of ore from the second level in the same mine, returned \$589. The total value of last week's ore output from this property was \$2,665. The yield of ore for February was 64 tons 1,086 pounds, the total value of which is \$3,436.14, an average of \$53.71 per ton. Work commenced last week on the Schwartz tunnel, the entrance to which is at Schwartzville, on Chicago creek. This tunnel is now in the mountain a distance of 300 ft, and it is the aim of Mr. Schwartz and sons, who are the owners of the tunnel site, to push the workings through to the ledge on which the Great Republican, Mattie and other locations have been made.

A GOLD BELT.—*Colorado Mining Gazette*, March 5: Up mill creek near Dumont there is a tract which has historic interest for Coloradans. Old kettles, rusted implements of warfare and culinary relics indicate that this place was used as a camping ground by the hardy 50ers followed. Clear creek to Idaho Springs and Central. Trappers and records agree in proving this old time camp to be one of Fremont's outposts two score years ago. So little is this interesting section of Clear creek county known that piles of rocks raised by human hands have never been sufficiently disturbed to discover whether they are the tombs of Indians, or white men. Sanguine prospectors claim that there is running between this point and Empire a gold belt equal in richness to the placer wealth of Corral d'Alene region. The gold producing section extends from the head of Mill creek to upper Empire or beyond, covering a surface of about two and a half miles, in width by six or thereabouts in length. A miner generally reliable and well known states that one dinner bucket containing \$16 and another \$24 worth of gold were panned in a day each, in Clear creek Corral d'Alene. There is likelihood of the existence of a rich gold center somewhere between the fine fissures of Gilpin county and those of Empire.

WHITE PINE.—*Cone*, March 8: A meeting of the managers of the North Star mine was held this week, and it was decided to shut down the mine for a short time on account of the difficulty of keeping the roads open. The suspension will be of short duration, however, as the company has a number of orders in from different smelters which must be filled. Less work has been done in mining in camp this week than at any previous time during the winter. The snow has drifted so heavily of late that all ore teams have been taken off, so that no shipping was done during the week. But a small force has been at work on the Carbonate King, and on Monday the North Star temporarily shut down. Work on the Parole continues, with good results; Porter and Stevenson are working the Evening Star; the Eureka work goes on steadily; Hess and partners are sinking the Sedalia; the owners of the Lela-Etta are doing some good work; the Silver Trowel is being developed; Jack Bailey and partners are crowding the Albany for all it is worth, and some assessment work is being done in various parts of the camp. As a whole, however, this has been one of the duller weeks in the history of White Pine. But look out for a stir when fair weather once smiles upon us.

IDAHO.

WOOD RIVER BULLION.—*Times*, March 5: During the month of February there were received at the Bailey Sampling Works 484,117 pounds of ore. In addition two carloads of Ramshorn bullion were also received and shipped to the Aurora (Ill.) Refinery. But for the heavy storms which blocked up the roads, the shipment would have been double. Still, the above is a very good showing.

MANY MEN.—*Cor. New Northwest*, March 5: George W. Carlton, who returned from the Corral d'Alene mines on Tuesday, says there are about 5,000 men there now, scattered in four or five incipient cities. The average increase is about 100 per day. The distance from Brinkup, Trout and Heron is about the same, 28 or 30 miles—and the population of the first two named is from 400 to 600. Each has plenty of big saloons, burly-houses, etc. Pat. Flynn & Co., and the company working the "Widow's Claim" expect to begin sluicing early in March. They have their drain ditches on, and almost water enough. Bedrock on the "Widow's Claim" is about six ft deep, and lays in waves, the big money being got in the depressions. This is the only claim yet opened. There was five ft of snow at the mines, but it began raining the day Carlton left. But little work can be done before May, and the rush in altogether premature.

EAGLE AND PRITCHARD CREEK.—*Cor. S. F. Bulletin*, March 8: There is no doubt that parties can come by one of the numerous routes at any time, if they are willing to endure the fatigue which thou-

sands have endured. Freight in limited quantities can also be brought in at from 20 to 30 cents per pound. The more important question, however, is when is the best time to come. People who wish to be first in starting any particular business are already too late. There are no lodging houses, and bunks are one dollar each per night. All meals are one dollar each, but the food is wholesome, abundant, and in greater variety than would be expected. Deer are quite numerous in the surrounding mountains, and venison is plentiful at 20 and 25 cents per pound. All provisions are high, but there is a sufficient quantity for all present demands. A man who brought 32 beds and a tent to Spokane Falls found that the freight would be \$1,200 from there to Eagle City. This fact probably accounts for the only hardship people have to endure, namely, the want of a proper place to sleep. Every saloon and store and cabin in the district is thrown open to parties who wish to spread their blankets on the floor, but the floors are usually damp, the space crowded and the nights cold, nor has the thermometer, in the coldest weather, fallen lower than 20 degrees below zero. If men wish to invest in town property, or to start in business, now is the time to come and secure locations and order goods. If a man wishes to invest in mines, he had better stay at home until April or May. Prospecting has been carried on to a very considerable extent, and development is a word which applies to only one or two mines in the district. Eleven claims have lines of sluices, and are said to be down to bed rock. These claims are known as: The Widow, Ives, Hapenstall, Wyant, Macomber, Campbell Points & Co., McQueen Moscow Co., Murray, Rockford Co., and Allman & Co. The gold is very coarse and is usually found in crevices of the bedrock. Nuggets varying in size from one to five dollars are frequently found, and larger and more valuable ones are reported, the largest being valued at \$140. The Widow claim is said to have yielded \$18,000, and others have paid handsome wages. No dependence can be placed on the fabulous statements which make every shovel of earth a shining mass of glistening gold, but enough truth exists in the reports to warrant hundreds of old miners in saying that there are good placer diggings here. Some good quartz ledges have been found, and there is a large number of men scattered all through the mountains searching for others. There is but one claim on which work is now being done, and that is The Widow. Snow lies upon the ground to the depth of four ft at Eagle, and it has until recently been much deeper. In the gulches and on the mountains the snow is quite deep, and prospecting is difficult work. The fact is, however, that there is no need of prospecting, as every foot of ground is located, and in many instances relocated. Parties do not look for diggings, they are only too happy to find unoccupied ground. Some locations, in out of the way places, are being recorded, but it is too late to hope for a claim in the principal mining region. There will doubtless be much contention and bloodshed in the spring, if the mines are as good as represented, for hundreds of cases of "jumping" have occurred. The grand rush which is anticipated in the spring has already commenced, but many who come in now return to their homes until the snow clears away. It takes but a day to walk out to the railroad, and when a man gets broke he has nothing to do but travel. There is little sickness, but many men have colds. There is no destitution, as work is abundant and wages promptly paid. Men of capital and brains are on the ground, and large sums of money are being invested.

COEUR D'ALENE.—*Cor. Ketchum Keystone*: As I have received many letters of inquiry about the Coeur d'Alene mines, and as each letter costs me 50 cents, and as I have \$1 a meal—well, I guess the boys will tumble. Good pay has been found a distance of thirteen miles up and down Pritchard creek, up Bear gulch about eight miles, and up quite a number of side gulches. Some ground has been found that prospects from one cent to nine cents per pan. Wherever bedrock is found it is rich. Many think this will be a rich camp, but I am not excited over the prospects, for I can see many drawbacks to the country's development. In the first place, the country is very flat and the bedrock very deep; this I consider a very great drawback. Again, heavy timber is growing all over the gravel grounds, and in most places there is no pay till bedrock is found. Eagle creek has been located some seven miles from its mouth, but it seems hard to get to the bedrock, and there has been very little done on it, and less profitable work. Beaver creek, about five miles south of Pritchard, is supposed to be good, and one company has taken out some gold this winter. It is hard to say how extensive the country is, but if one claim out of every twenty locations pays, it will be a good country. The number of locations are countless. As far as quartz is concerned, there is not much known. Snow came about the time the quartz prospectors did. I have seen some very good ore. They claim to have some four or five good prospects. Mr. Jake Colaugh, of Ketchum, has invested in some quartz. The Coeur d'Alene will not be as easy to prospect as the Wood River country, for there is too much timber and not enough grass here to make the work easy.

MONTANA.

MARYSVILLE.—*Helena Independent*, March 6: Recently it suited your correspondent to pay the Belmont mine a visit. Here was found Captain J. H. Burns and W. B. Pearson, who have been employed the past winter prospecting this once famous bullion producer. From a conversation with Captain Burns I learned that they had run a crosscut a distance of 105 ft on a level with the lower or No. 1 tunnel, and 575 ft from the mouth of the same. This crosscut is expected to cut the bonanza of rich quartz encountered in the north vein in tunnel No. 1. Three veins have already been cut, each from ten to eighteen inches in width, and prospecting quite well in gold. In the face of this cut there is considerable quartz, which is a fair indication that the ledge is not far off. It is very probable that in a few months more the old Belmont will be pounding away as of yore, and paying her way as she always has done. With the new improvements in saving the precious metals, as demonstrated at Gloster, it will, if adopted at Belmont, make a great difference in the product of the mine.

A LARGE LOAN.—Mr. Thomas Cruse yesterday made a loan of \$150,000 to the Montana Co. Limited, for one year at eight per cent per annum,

taking a mortgage for that amount upon the company property. This is the largest loan ever made by a private individual in the Territory. This money is intended to be used for the exclusive purpose of adding thirty more stamps to the twenty now being put up in the new mill at Marysville, thus giving the company sixty stamps in all. Mr. Cruse, who has undoubted faith in the Drum Lummion mine, volunteered to furnish the money for completing the work, thus enabling the company to retain its stock in the treasury. The offer was accepted by the company, and the money was paid over yesterday through the Merchants' National Bank. It is believed that the lower tunnel will strike the lead within the next two weeks, and if it proves as good as the lead above, which is confidently expected, the stock of the company will be worth a premium of three or four hundred per cent. Such a result will demonstrate the wisdom of borrowing money and retaining the unsold stock in the treasury of the company.

THE DRUM LUMMON.—*Inter-Mountain*, March 8: The ore body of the Drum Lummion has been tapped by the Masklyn tunnel which intersected the ledge at a depth of about 600 ft. The ore, which is reported to assay well, has been penetrated to a depth of three or four ft and the extent of the strike cannot therefore be stated. It is, however, a very important development and sets at rest all doubts as to the permanence of the mine. The ore lies next to a porphyry dyke on the foot wall, in which the tunnel face has been for some time past.

MURRAY DISTRICT.—*Inter-Mountain*, March 8: There is no mining camp in Montana that has a more promising future than Murray district, which is situated about 15 miles south of the Springs. The ore bodies are tapped by a number of farmers of Gallatin valley and business men of Bozeman, who have ample means at their command to develop the district. The copper ore taken from the mines there is said to be the best yet found in Montana, and the deposits are said to be sufficiently great to warrant the erection of a smelter, which it is proposed to put up in the spring. We feel confident that the new camp will become a place of importance in the near future.

NEW MEXICO.

STRIKES AND TRANSFERS.—*Silver City Enterprise*, March 6: A new mining company is organizing for Telegraph district. A new strike has been made in the Viola, at Pyramid. It is said by knowing ones that extensive work will soon be commenced on the Blue Bell mine. With every foot of work accomplished upon the disputed Rose claim at Bullard's Peak, the property shows up to a better advantage. Mullen & Kerr are steadily developing the property. Eight men were put to work on the mining of the Telegraph Mountain and Gila River Mining Co. last week. It is probable that work will soon be commenced on an extensive scale in that district. The promising group of claims purchased by Mr. Schulte, of St. Paul, and others are being opened up systematically. The Pumpkin claim of this group has a fifty-foot shaft, and the Butternut mine has improved with every foot of work done. At a depth of 65 ft, ore of the same character as that of the Black Hawk has been encountered, and the prospect is so promising that a contract has again been let to continue sinking. Upon Mr. Schulte's return from the East, work on an extensive scale will be commenced on this group. Some importance is felt outside this city in the coal strike made near Bullard's Peak. It is rapidly advancing in popular favor, and is generally recognized as a big thing. During the week the mineral expert of the Southern Pacific Railroad, and several other gentlemen of prominence have visited the ground, and agree that it is a most important discovery. It is said that the Southern Pacific Railroad Co. will make the owners a proposition, and if acceptable, will develop the property extensively. The coal is genuine anthracite, and much superior in quality to any yet discovered in the Territory. At present the ledge is fully three feet in width, where on the surface it was but a few inches. Great interest is being taken in the development of this claim.

UTAH.

REVIEW.—*Salt Lake Tribune*, March 7: For the two months of the present year the receipts of bullion (excluding ore) have been as follows: January, \$449,228.74; February, \$361,666.47. During the week ending March 5th inclusive, the receipts of bullion in Salt Lake City were \$111,645.22, and of ore, \$8,880; of both, \$1,020,225.22. The week before, the receipts were \$106,388.05 in bullion, and \$6,000 in ore. The shipments from this city for the week ending Saturday, March 1st, inclusive, were as follows: 19 cars bullion, East, 1,234,625 pounds; 1 car antimony, East, 23,673 pounds; 3 cars white lead, East, 67,345 pounds; 48 cars ore East, 1,020,000 pounds; total 101 cars, 2,345,643 pounds. The shipments of the Horn Silver for the week were eighteen cars of bullion, \$54,000. Total shipments for the year to date, \$375,000. A lively interest is taken in this company, and favorable comments on its annual report are quite common in Eastern journals. The Ontario shipped for the week, 22 bars of bullion, \$35,655.22. Total for the year, \$289,830.09. This mine was never before in so good a condition as now, and its prospects are as bright as its record, which is saying plenty. The Stormont sent up two bars of silver, \$3,820. The product of the Hanauer smelter for the week was eight cars of bullion, \$14,600. The Crescent sold and shipped ore to the amount of \$8,880. It shipments to the Macintosh sampler are reported as follows in the *Record*: February 23d, 103,550 pounds; February 24th 107,640 pounds; February 25th, 112,990 pounds; February 26th, 117,520 pounds; February 27th, 121,260 pounds; February 28th, 124,410 pounds. February 29th, 139,060 pounds; Total \$26,430 pounds. From the same we learn that the Sampson shipped to Macintosh's sampling works during the week 25,740 pounds of first-class ore. Total for the month of February, 64 tons, which netted the company over \$100 per ton. The Sampson mine is constantly improving as depth is attained, and it will in all probability become one of the mainstays of the camp. The shipments of ore alone speak volumes for the property. Already they reach about \$6,000 per month, and are constantly increasing as development progresses.

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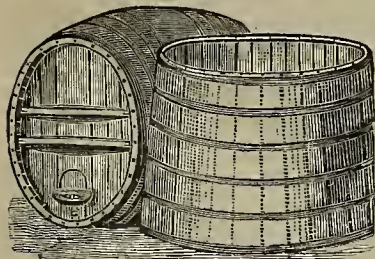
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Ingersoll, D2 3", beat Rand 3 1/2"	.744 " "
Ingersoll, D2 3", beat National 3 1/2"	.505 " "
Ingersoll, E 3 1/2", beat Rand 3 1/2"	.500 " "
Ingersoll, E 3 1/2", beat National 3 1/2"	.321 " "
National beat Rand	.139 " "

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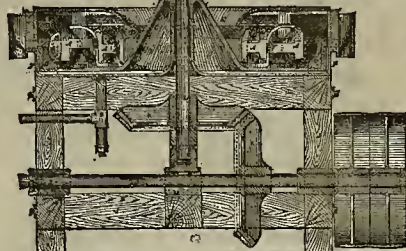
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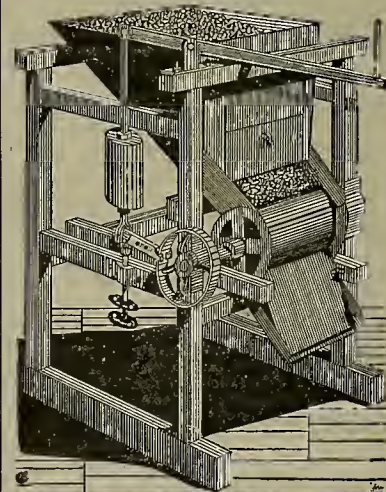
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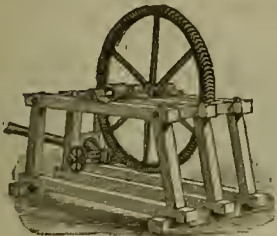
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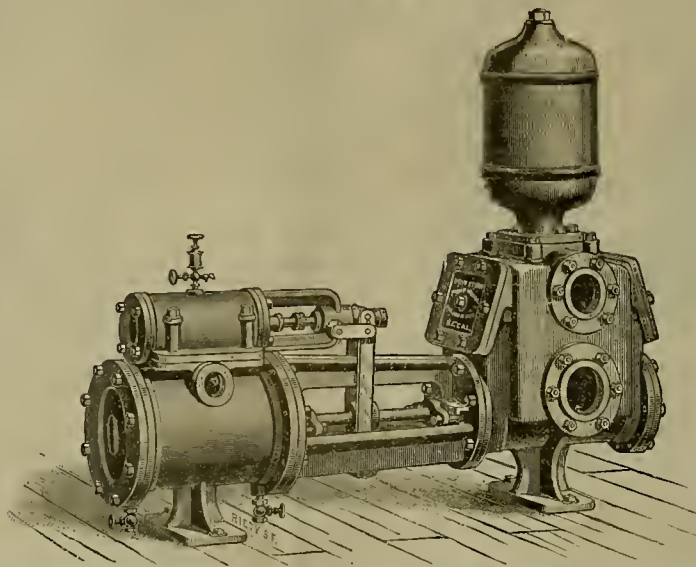
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This is the only Scientifically Constructed Bucket in the market. It is struck out from charcoal stamping iron. No corners to catch. No seams to burst. No inferior corners to clog up. It runs with great ease, and half the power of the old style bucket. WILL OUT-WEAR HALF A DOZEN OF THEM.

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Patent Life-Saving Respirator.

PREVENTS LEAD POISONING AND SALIVATION.

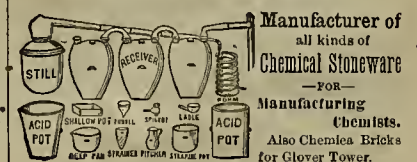
invaluable to those engaged in dry crushing quartz mills, quick-silver mines, white lead corroding, feeding threading machines and all occupations where the surrounding atmosphere is filled with dust, obnoxious smells or poisonous vapors. The Respirators are sold subject to approval after trial, and, if not satisfactory, the price will be refunded. Price, \$3 each, or \$30 per dozen. Address all communications and orders to



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43 Sacramento Street, San Francisco, Cal.

RICHARD C. REMMEY, Agen,
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of Chemical Stoneware — FOR — Manufacturing Chemists. Also Chemical Bricks for Glover Tower.

"DUNCAN" ROCK DRILL!

FOR MINES, QUARRIES, ETC.

J. CUYAS, Agent,

10 Park Place, - - New York

PACIFIC POWER CO.

Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.]

FOR WEEK ENDING MARCH 4, 1884.
 294,430.—ROCK DRILL—Barlow & Emery, Nevada City, Cal.
 294,361.—CRUSHING ROLL—W. H. H. Bowers, Salt Lake City, U. T.
 294,616.—DEVICE FOR DESTROYING INSECTS—C. J. Gustavson, Salt Lake City, U. T.
 294,737.—APPARATUS FOR REMOVING SAND BARS ETC.—L. A. & N. E. Johnson, Portland, Oregon.
 294,481.—GATE—J. R. Lowe, Anderson, Cal.
 294,649.—GATE—D. B. Matlock, Red Bluff, Cal.
 294,654.—STEAM BOILER FURNACE—L. L. Merrill, S. F.
 294,493.—FENCE POST—E. D. Miner, Dayton, W. T.
 294,505.—BAG HOLDER—A. Robinson, Benicia, Cal.
 294,693.—HAY LOADER—M. M. Sornborger, Millville, Cal.
 10,973.—TRADE MARK—Bothin Manufacturing Co., S. F.
 10,974.—TRADE MARK—California Fig Syrup Co., S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

GATE.—John R. Lowe, Anderson, Shasta Co., Cal. No. 294,481. Dated March 4, 1884. This invention relates to certain improvements in field gates and the means for holding them open while being passed. It consists in a combination of devices. It is certain in operation, not liable to derangement, and springs may be dispensed with.

ROCK DRILL.—Charles O. Barlow and George T. Emery, S. F., assignors of part interest to Joseph W. Sprague, Nevada City. No. 294,430. Dated March 4, 1884. This rock drill consists in a body bar carrying the power mechanism, the drill, the hammer, and the means for operating said hammer and rotating the drill, said bar being suspended from and adapted to slide upon a cross-bar which is attached to a supporting column in such a manner as to have a vertical, horizontal and inclined adjustment. The drill may be run by a "hurdy-gurdy" water wheel or an engine.

A BAD FALL.—John Watson, the engineer of the California Sugar Refinery, met with a very bad accident this week. While the steamer *Alameda* was discharging at the refinery he was precipitated into the hold, a distance of 50 feet. He was picked up in an insensible condition, when it was ascertained that he had three ribs broken, and also suffered other internal injuries. He was conveyed to his residence, on Ninth street, in a very precarious condition.

FRITCHARD, who spent so much time and labor and underwent so many hardships in bringing the *Coeur d'Alene* mines into prominence, is meeting with that ingratitude which is always the portion of great discoverers. He has been robbed of his property in the new mining district, and now all that he has left for all his years of toil is one very ordinary (in value) placer claim, everything else having been gobbled by the insatiable jumpers.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

MINING SALE.—Archie Farington, the well-known mine owner of Garfield, has bought the Lee & Lacy mine, about nine miles from Soda Springs. It is said that he paid \$10,000 for it. It is expected that work will be commenced at once. This is one of the best developed and most promising mines in Esmeralda county.—*Walker Lake Bulletin*.

The 10 prospectors supposed to have perished in the *Coeur d'Alene* mountains have arrived at Trout Creek station.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alaska M. Co.	California	4.	2.00	Feb 6.	Mar 8.	Mar 28.	A. Judson	320 Sansome st.
Alpha Hydraulic M. Co.	California	25.	Jan 25.	Mar 25.	Apr 25.	Apr 25.	P. M. Scott	326 Montgomery st.
Alta M. Co.	Nevada	28.	25.	Jan 28.	Mar 3.	Mar 24.	W. H. Watson	302 Montgomery st.
Belle Isle M. Co.	Nevada	7.	20.	Mar 12.	Apr 17.	May 17.	J. W. Pew	310 Pine st.
Belmont M. Co.	Nevada	36.	75.	Feb 20.	Mar 31.	Apr 30.	J. W. Pew	310 Pine st.
Benton Con. M. Co.	Nevada	12.	20.	Feb 5.	Mar 11.	Mar 31.	W. H. Watson	302 Montgomery st.
Best & Belcher M. Co.	Nevada	28.	50.	Feb 5.	Mar 14.	Apr 2.	W. H. Watson	309 Montgomery st.
Champion M. Co.	California	14.	07.	Mar 7.	Apr 10.	Apr 28.	Theo. Wetzel	522 Montgomery st.
Con. Virginia M. Co.	Nevada	20.	20.	Mar 12.	Apr 16.	May 10.	A. W. Havens	309 Montgomery st.
Coeur d'Alene M. Co.	Mexico	1.	5.	Mar 4.	Apr 7.	Apr 28.	O. M. McLasen	324 Pine st.
Caborn M. Co.	California	1.	15.	Jan 15.	Feb 15.	Mar 17.	W. J. Taylor	220 Sansome st.
Diana M. Co.	Mexico	8.	10.	Mar 5.	Apr 9.	Apr 3.	P. J. Flanagan	318 Pine st.
Excelsior Water Co.	California	6.	50.	Jan 23.	Mar 18.	Apr 10.	H. B. Wheaton	215 Sansome st.
El Dorado M. Co.	Nevada	2.	08.	Mar 6.	Apr 9.	Apr 23.	J. H. Sayre	320 Pine st.
Elko Con. M. Co.	Nevada	3.	15.	Mar 4.	Apr 8.	Apr 25.	F. Spiering	309 California st.
Elmtracht Gravel M. Co.	California	14.	5.	Jan 5.	Feb 27.	Mar 18.	H. Kane	309 California st.
Gould and Curry M. Co.	Nevada	47.	50.	Mar 7.	Apr 11.	May 5.	A. K. Durbin	309 Montgomery st.
Grand Prize M. Co.	Nevada	15.	25.	Feb 23.	Apr 3.	Apr 23.	E. M. Hale	327 Pine st.
Gorilla M. Co.	California	3.	10.	Feb 27.	Mar 31.	Apr 30.	A. A. Enquist	436 Montgomery st.
Heard Center M. Co.	Arizona	4.	15.	Jan 23.	Mar 4.	Apr 26.	J. W. Pew	310 Pine st.
Independence M. Co.	Nevada	13.	20.	Mar 12.	Apr 16.	May 10.	A. W. Havens	309 Montgomery st.
Indian Spring Drift M. Co.	California	1.	30.	Feb 13.	Mar 22.	Apr 19.	A. B. Paul	320 Montgomery st.
Jupiter Deep Blue Gravel M. Co.	Cal.	1.	1.00	Dec 17.	Feb 16.	Apr 4.	G. Lande	426 California st.
Justice M. Co.	Nevada	40.	12.	Mar 3.	Apr 7.	Apr 26.	R. E. Kelly	419 California st.
Snake County Quartz M. Co.	California	8.	12.	Mar 10.	Apr 16.	May 5.	A. Baird	430 California st.
Loretto M. & M. Co.	Mexico	50.	50.	Feb 23.	Mar 25.	Apr 10.	H. G. Jones	327 Pine st.
Morgan M. Co.	California	10.	60.	Feb 27.	Mar 27.	Apr 28.	C. L. Tilden	806 Market st.
Morrill Con. M. Co.	California	1.	10.	Jan 24.	Feb 24.	Mar 19.	J. J. Donovan	436 Montgomery st.
Milton M. Co.	California	1.	1.00	Feb 14.	Mar 24.	Apr 12.	H. Pichler	320 Sansome st.
North Gould & Curry M. Co.	Nevada	6.	15.	Mar 5.	Apr 6.	Apr 25.	J. Morio	328 Montgomery st.
New Coso M. Co.	California	17.	40.	Jan 13.	Feb 23.	Mar 31.	E. B. Clement	710 Washington st.
Northern Belle	Nevada	42.	6.00	Jan 30.	Mar 10.	Apr 4.	W. Willis	309 Montgomery st.
Ophir M. Co.	Nevada	46.	50.	Feb 2.	Mar 6.	Mar 26.	E. B. Holmes	309 Montgomery st.
Puget Sound Iron Co.	Washington	7.	1.00	Mar 12.	Apr 25.	May 29.	A. Halsey	328 Montgomery st.
Piedro Coro M. Co.	Arizona	1.	6.	Feb 23.	Apr 7.	Apr 29.	J. Stadplat	419 California st.
Pleasant Valley M. Co.	Cal.	3.	10.	Mar 3.	Apr 7.	Apr 25.	C. E. Elliott	309 Montgomery st.
Sage M. Co.	Nevada	34.	50.	Feb 31.	Apr 3.	Apr 23.	E. B. Holmes	309 Montgomery st.
Sierra Nevada S. M. Co.	Nevada	73.	1.00	Jan 16.	Feb 20.	Mar 17.	F. L. Parker	309 Montgomery st.
Union Gravel M. Co.	California	18.	50.	Jan 18.	Feb 26.	Mar 18.	H. Pichler	324 Sansome st.
Union Con. M. Co.	Nevada	26.	1.00	Mar 6.	Apr 8.	Apr 28.	J. M. Burlington	309 California st.
Wildman M. Co.	California	1.	25.	Feb 13.	Mar 28.	Apr 28.	R. E. Kelly	310 Pine st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Chollar M. Co.	Nevada	W. E. Dean	309 Montgomery st.	Annual	Mar 19
Champion M. Co.	California	Theo. Wetzel	422 Montgomery st.	Annual	Apr 8
James Con. M. Co.	California	D. C. Bates	309 Montgomery st.	Annual	Mar 25
Jackson M. Co.	California	D. C. Bates	309 Montgomery st.	Annual	Mar 24

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M. Co.	California	J. Bates	309 Montgomery st.	25.	Mar 15
Buena Vista M. Co.	California	W. Willis	309 Montgomery st.	10.	Jan 23
Contention Con. M. Co.	Arizona	D. C. Bates	309 Montgomery st.	25.	Jan 23
Derbec Blue Gravel M. Co.	California	T. Wetzel	522 Montgomery st.	10.	Mar 15
Idaho M. Co.	California	D. C. Bates	309 Montgomery st.	4.00	Dec 2
Jackson M. Co.	California	D. C. Bates	309 Montgomery st.	10.	Feb 19
Kentuck M. Co.	California	J. W. Pew	310 Pine st.	10.	Feb 19
Standard Con. M. Co.	California	Wm. Willis	309 Montgomery st.	25.	Mar 12
Silver King M. Co.	Arizona	J. Nash	315 California st.	25.	Dec 15
Syndicate M. Co.	California	J. Stadplat	419 California st.	10.	Mar 5

San Francisco Metal Market.

WHOLESALE.		THURSDAY, MAR. 13, 1884.	
ANTIMONY—Per pound.	14 00	5	23 00
IRON—American Pig, soft, ton.	24 00	26 00	—
Scotch Pig, ton.	24 00	—	—
American White Pig, ton.	—	—	—
Oregon Pig, ton.	—	—	—
Hipper Cap, Nos. 1 to 4.	3 00	31	—
Refined Bar.	5 50	—	—
Horseshoes, per 100.	7 00	—	—
Nail Rod.	7 00	—	—
—, way, according to thickness.	6 00	7	—
2½" English Cast, lb.	14 00	15	—
Black Diamond, ordinary sizes.	9 00	—	—
Drill.	15 00	16	—
Machinery.	12 00	14	—
COPPER—Ingot.	22 00	—	—
Brass—sized.	30 00	38	—
Fire box sheets.	31 00	—	—
Nails.	17 00	—	—
Bolt.	23 00	—	—
Old.	8 00	—	—
Bar.	12 00	—	—
Cement, 100 lbs.	12 00	—	—
LEAD—Pig.	4 00	4	—
Bar.	5 00	6	—
Pipe.	7 00	—	—
Sheet.	8 00	—	—
1 lb. sheet, 100% on 500 long.	2 10	—	—
Block, 3 bag.	2 30	—	—
Chilled, do.	2 50	—	—
TIN PLATES—Charcoal.	6 00	6 50	—
Coke.	6 50	6 75	—
Bacon Tin.	24 00	—	—
Antimonial.	21 00	—	—
L. C. Charcoal R. roofing, 14x20.	6 50	6 80	—
ZINC—By the cask.	19 00	—	—
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	3 25	3 40	—
N 15s—A. S. S. S.	3 25	—	—
QUICKSILVER—By the flask.	34 00	34 1/2	—
Flasks, new.	1 05	—	—
F. ks, old.	85 00	—	—

Mining Share Market.

Fluctuations in prices have been more apparent during the past week than has been the case of late. The market has not been quite so dead. At the Gold Hill mines all is going on well since the starting up of the mills on the Carson river.

The airway on the 2900 level, jointly run by the Sierra Nevada, Mexican and Union Con., has been completed, and operates splendidly, carrying away the current of heated air that comes up from the 3100 level. On the 3100 level the diamond drill is still being run from the face of No. 1 crosscut in Union Con.

In the Sierra Nevada the northeast drift is still in vein material. It is not expected that much change will be seen until crosscutting is begun. Doors are being put in on the 2900 level for the regulation of the ventilation in the northern part of the mine.

Bullion Shipments.

Hanauer, March 5, \$1,680; Crescent, 5, \$2,550; Horn Silver, 5, \$9,000; Ontario, 5, \$4,466; Stormont, 6, \$3,820; Hanauer, 6, \$2,100; Horn Silver, 6, \$9,000; Ontario, 6, \$4,640; Hanauer, 7, \$4,100; Horn Silver, 7, \$6,000; Ontario, 7, \$4,863; Moulton (for January), \$65,000; Crescent, 8, \$3,350; Hanauer, 8, \$1,950; Horn Silver, 8, \$3,000; Ontario, 8, \$4,895; Hanauer, 9, \$2,030; Horn Silver, 9, \$6,000; Ontario, 9, \$4,687; Horn Silver, 11, \$15,000; Ontario, 11, \$9,880; Lexington (for February) \$90,000; Bodie (for February), \$103,000. The banks of Salt Lake City report the receipt for the week ending March 5th, inclusive, of \$111,645 22 in bullion, and \$8,880 of ore; of both, \$120,525 22.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING FEB. 21.	WEEK ENDING FEB. 23.	WEEK ENDING MAR. 6.	WEEK ENDING MAR. 13.
Alpha.	1.55	1.75	1.65	2.00
Alta.	1.60	1.90	1.55	1.75
Andes.	.30	.35	.30	.40
Argenta.	.05	.10	.05	.05
Belcher.	.80	.90	.90	1.00
Bell.	.20	.25	.20	.25
Best & Belcher.	2.40	2.60	2.60	2.70
Bullion.	.60	.60	.70	.85
Bonanza King.	.40	.45	.40	.50
Bodie.	.65	.60	.50	.60
Bodie Con.	.65	.60	.50	.60
Benton.	.20	.25	.15	.20
Bodie Tunnel.	.20	.25	.15	.20
Bulwer.	.20	.20	.20	.25
California.	.20	.20	.20	.25
Challenge.	.25	.25	.25	.30
Champion.	.15	.20	.20	.25
Chollar.	1.95	2.35	2.25	2.70
Confidence.	1.00	1.10	1.50	1.50
Con. Virginia.	.20	.25	.25	.30
Con. Pacific.	.20	.25	.25	.30
Crown Point.	.20	.25	.25	.30
Day.	2.15	2.40	2.20	2.40
Derbec.	1.25	1.60	1.60	1.80
Eureka.	.30	.35	.40	.45
Eureka Tunnel.	.30	.35	.40	.45
Excelsior.	.30	.35	.40	.45
Grand Prize.	.15	.15	.15	.15
Gould & Curry.	1.80	1.75	2.05	1.90
Goldshay.	.40	.40	.40	.45
Hale & Norcross.	1.35	2.20	2.15	2.30
Holmes.	1.20	1.25	1.25	1.40
Independence.	.35	.25	.30	.15
Julia.	.15	.15	.15	.15
Justice.	.20	.20	.20	.20
Martin White.	.70	1.50	.75	.80
Mono.	1.25	1.50	1.25	1.40
Mexican.	2.00	2.30	2.40	2.70
Mt. Diablo.	2.00	2.00	2.00	2.50
Northern Belle.	.05	.05	.05	.05
Navajo.	2.70	2.95	2.65	2.70
North Belle Isle.	.25	.30	.25	.25
Occidental.	1.20	1.40	1.90	1.35
Ophir.	.40	.40	1.90	.25
Overman.	.30	.30	.30	.30
Potosi.	.15	1.40	1.05	1.25
Pinal Con.	.35	1.10	.70	.95
Sage.	.50	.70	.95	.65
Seg. Belcher.	.50	.70	.95	.65
Sierra Nevada.	2.15	3.60	3.45	3.80
Silver Hill.	.10	.10	.10	.10
Silver King.	.40	.45	.40	.45
Scorpion.	.40	.45	.40	.45
Syndicate.	.40	.45	.40	.45
Tioga.	.10	.10	.10	.10
Union Con.	1.80	3.25	3.00	3.10
Utah.	1.75	2.00	1.85	2.10
Yellow Jack.	2.40	2.50	2.25	2.40

Sales at San Francisco Stock Exchange

THURSDAY A. M., MAR. 13.		AFTERNOON SESSION.	
700 Alta.	1.55@1.70	300 Alta.	1.65@1.70
125 B. & B.	1.50@1.70	50 B. & B.	1.65@1.70
420 Bodie Con.	1.00@1.10	200 Bodie Con.	1.00@1.10
300 Benton Con.	1.00@1.10	750 Bodie.	1.00@1.10
100 Belle Isle.	1.00@1.10	500 Bulwer.	2.20@2.25
110 Belcher.	1.00@1.10	100 Bodie.	1.00@1.10
100 Bullion.	1.00@1.10	1000 Champion.	1.00@1.10
335 Chollar.	1.55@1.60	200 California.	1.00@1.10
150 Crown Point.	1.00@1.10	250 Con. Pacific.	1.00@1.10
100 Con. Virginia.	1.50@1.60	1000 Eureka.	1

MACBETH'S —PATENT— STEEL PULLEY.



Advantages of these Pulleys.
They are less than half the weight of cast-iron pulleys; are polished on the face; are made either crowned or straight, and are turned in the lathe the same as the best make of cast-iron pulleys.
They are carefully balanced. They are subject to no contraction strains, and can be run at very high speed without danger of bursting.
On account of their great lightness and the form of the arms, they absorb less power than any other pulley.
They are the only pulley of the kind which runs true. They cannot be broken in transport.

TESTIMONIAL:

MATHER LANE SPINNING CO. (Limited),
LEIGH, ENGLAND, Nov. 5, 1883.
N. Macbeth, Esq., Dear Sir: The Patent Steel Pulleys supplied throughout to our No. 2 Mill are working to our entire satisfaction.
They are very true, and are about 50 per cent lighter than the cast-iron pulleys in our No. 1 mill.
Yours faithfully,
For the Mather Lane Spinning Co. (Limited),
[Signed:] RICHARD T. MARSH,
Managing Director.

Ridson Iron & Locomotive Works,

Sole Manufacturers and Agents for the
Pacific Coast,
S. E. Cor. Beale & Howard Sts., San Francisco.
Send for Circular and Prices.

AMERICAN MACHINE AND MODEL WORKS.

Nos. 111 and 113 First St., San Francisco.
Specialties—Mold Making and Band Instrument Repairing.
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I. A. HEALD, Proprietor.

THE HARMON SEMINARY, Berkeley, Cal.

A BOARDING AND DAY SCHOOL FOR
YOUNG LADIES.
This institution will be continued with the spirit and methods of its founders by those who have been up with them in their educational work. The corps of instructors is full and of recognized excellence in all departments.
Address, THE MISSSES HARMON, Berkeley, Cal.,
Or E. J. WICKSON, 414 Clay St., S. F.

GIANT POWDER

MANUFACTURED UNDER ALFRED NOBLE'S Original and only valid Patents for NITRO-GLYCERINE Powders, which has been and still is of such immense advantages to the Miner, Railroad Man and the Engineer. All other Nitro-Glycerine Compounds are simply imitations and adulterations of the Original Giant Powder. The GIANT POWDER COMPANY manufacture three grades of Powder, which are the Safest and Strongest High Explosives in the market. The Original Nitro-Glycerine Compound, GIANT POWDER or DYNAMITE, is acknowledged by all the great chemists of the world as unapproached by any other compound. The GIANT POWDER COMPANY have acquired the exclusive right to manufacture "NOBLE'S EXPLOSIVE GELATINE," which contains 96 per cent. of Nitro-Glycerine. It is still stronger than Dynamite, and even safer in handling. This explosive was used in constructing the Mont Vent Tunnel. THE JUDSON POWDER is a black Powder owned and manufactured by the GIANT POWDER COMPANY; is from three to five times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it Breaks More Ground, Pulverizes Better, and Saves Time and Money. The only difficulty heretofore experienced by some consumers of this Powder has been that it required more time to get it to the bottom of a deep borehole. This has now been entirely overcome, and our JUDSON IMPROVED is now as dry as the ordinary Blasting Powder and runs as freely.

Triple, Quadruple and Quintuple Caps and all grades of Fuse for Sale.
BANDMANN, NIELSEN & CO.,
General Agents, San Francisco, Cal.



Carry Engines and Boilers in Stock for Immediate Delivery.

H. P. GREGORY & CO., Agents, San Francisco, Cal.



NEVIN'S CELEBRATED Patent Ore Roasting and Chloridizing FURNACE.

Working up to 93 per cent. of Fire Assay, using 25 per cent. less salt since July, 1882.
R. A. NEVIN, Patentee,
Address, R. A. NEVIN, Patentee,
ATLAS IRON WORKS, 217 Fremont St., San Francisco, Cal.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE
Standard Consolidated Mining Company.

San Francisco, March 1, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 64, of twenty five cents (\$25) per share, was declared, payable on WEDNESDAY, March 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.
WILLIAM WILKINS, Secretary.
OFFICE: Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

ASSESSMENT NOTICE.

Gould and Curry Silver Mining Company.
ASSESSMENT No. 47.

Levied..... March 7, 1884
Delinquent..... April 11, 1884
Day of sale..... May 5, 1884
Amount..... Fifty cents per share
ALFRED K. DUBROW, Secretary.
OFFICE: Room No. 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

New Book on Assaying Gold & Silver Ores.

By C. H. AARON.

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Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scoriafication; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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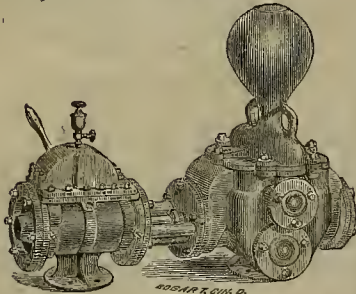
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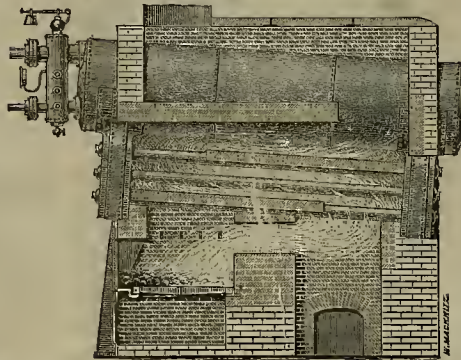
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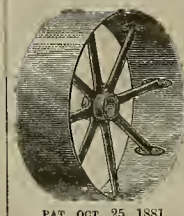
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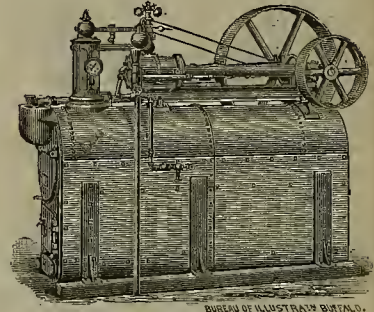
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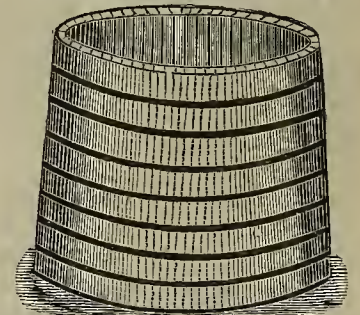
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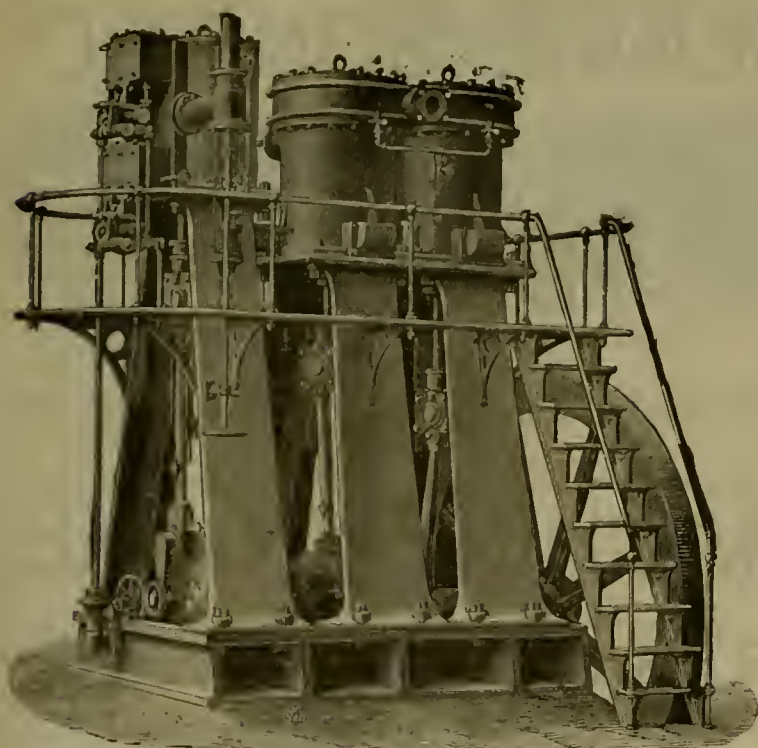
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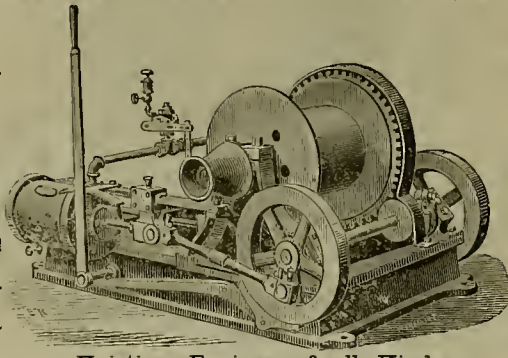
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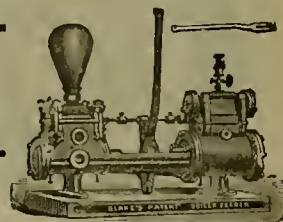
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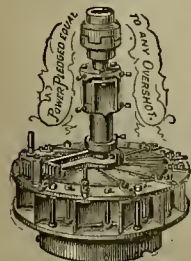
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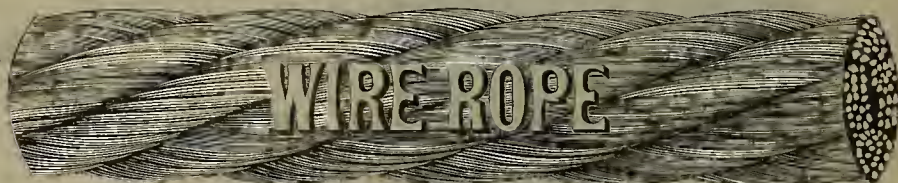
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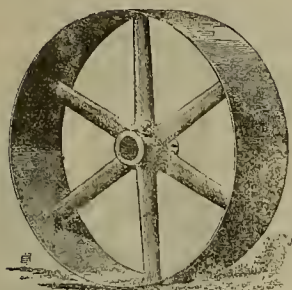
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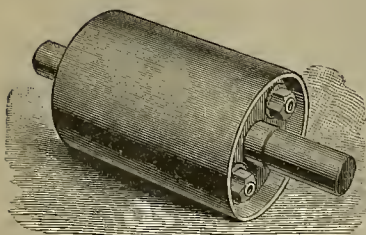
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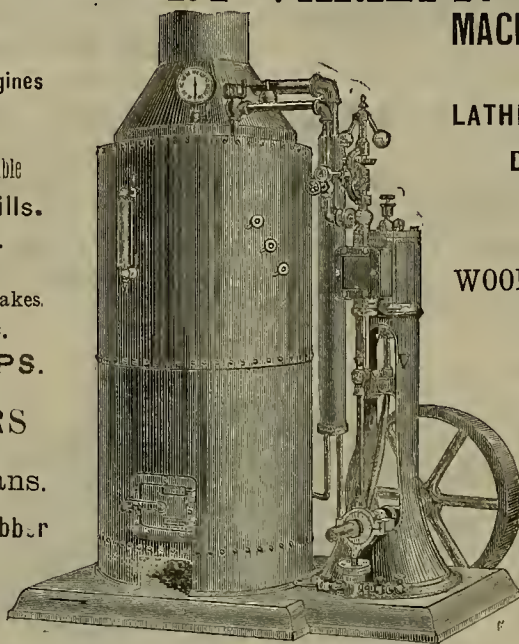
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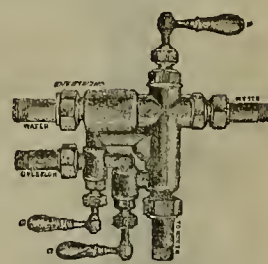
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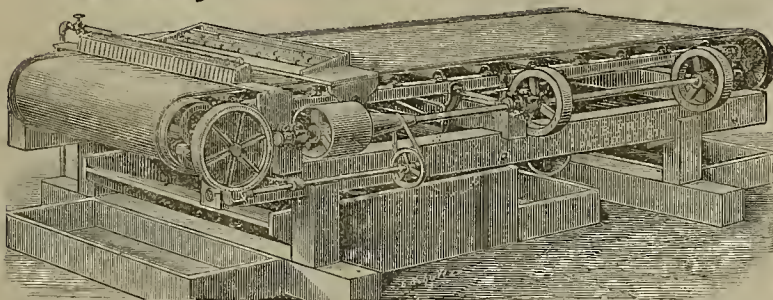
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On the steamers *Alameda* and *Mariposa* which run between this port and Honolulu, on the Oceanic Steamship Company's line, an improved device has been adopted for raising the

ashes from the fire room and passing them overboard, without any handling at all. The device was invented and patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Mr. John D. Spreckels, one of the principal owners in the line and the senior of the firm acting as agents. The engraving on this page shows the general idea of the apparatus, which, though simple as it may appear, is a very great addition to the convenience and comfort of passengers, as well as labor-saving to the firemen and coal passers.

Ordinarily ashes are hoisted by iron chains and buckets and dumped into a chute, a process accompanied by a considerable manual labor and a good deal of noise. On a big ocean steamer, burning from 100 to 200 tons of coal a day, this ash-hoisting goes on periodically, the clanking of the chain and bang of buckets being one of the annoying features of ocean travel. In the improved apparatus invented by Mr. J. D. Spreckels, all this is done away with the operation being conducted noiselessly.

On the hearth of the fire-room is an iron receiver into which the ashes are dumped. The refuse from the fire room at the opposite end of the boilers is brought in iron buckets, such as are used for passing coal, and which are suspended by chains from rollers which run on rails above, as the engraving shows. The ashes are dumped on the iron floor and wet down so as to cool them and prevent them from injuring the elevator belt, after which they are raked into the receiver whenever they accumulate so as to be inconvenient.

The receiver is so arranged that the tension of the belt is adjustable. As the belt revolves, the

buckets scoop up the ashes deposited in the receiver, carrying them to the upper deck, where they fall into a chute-pipe leading downwards to the water-line of the vessel. The power to operate the belt is a small engine on the side of the casing, which receives its steam from the

extends down through the second deck in a nearly vertical position, and below the deck it curves outward so as to assume a more nearly horizontal position and pass out through the side of the vessel, thus obstructing the interior space to the least extent. As the material

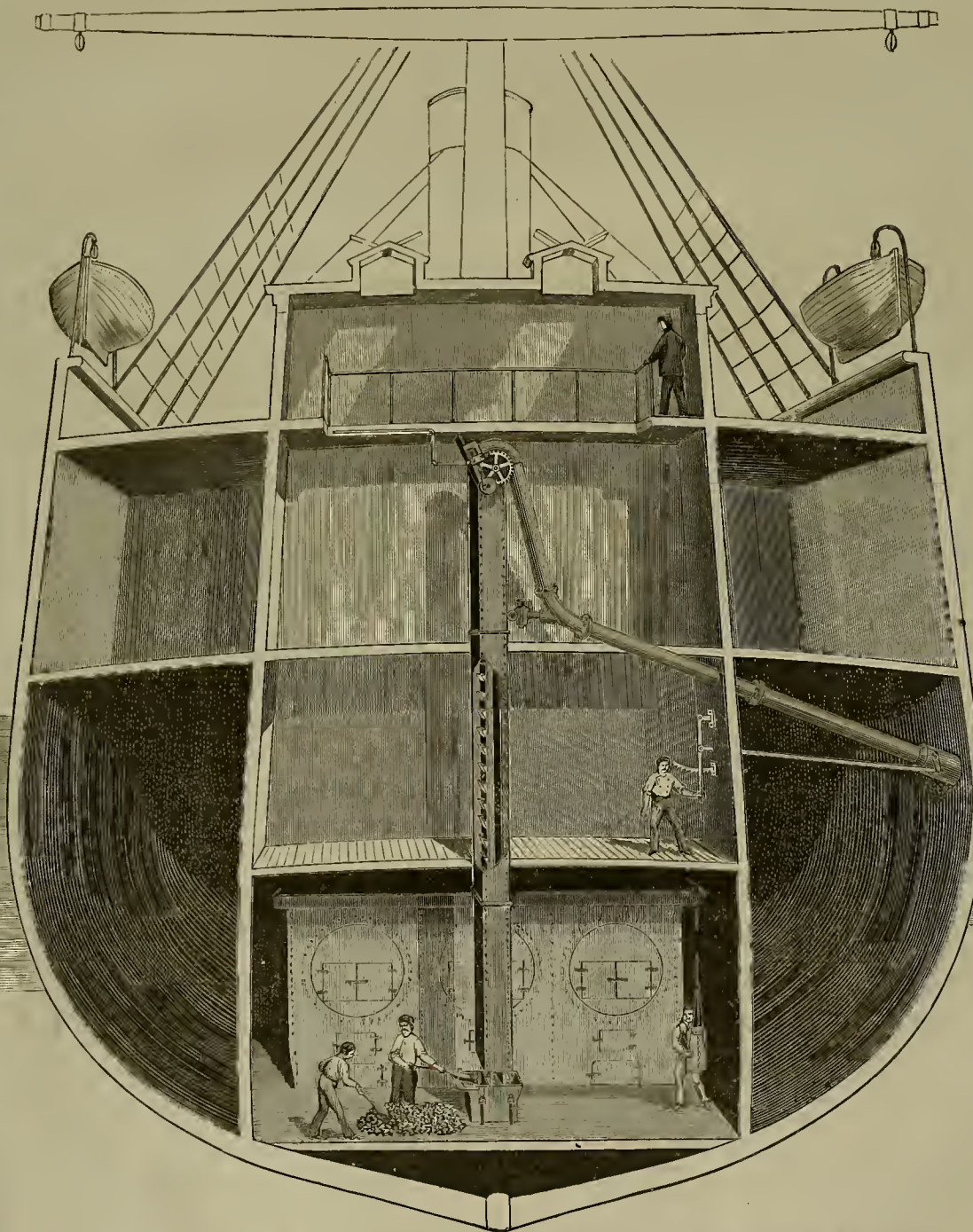
A gate is fitted into the discharge chute, near its outer end, and serves to close it when not in use, preventing ingress of water. This valve or gate swings in a chamber of somewhat larger diameter than the rest of the pipe, so that when it is open it is out of the way and leaves a clear

passage. Its shaft has a lever arm with a connecting rod and hand lever, by which it may be opened and closed, and a curved link or rack with a set screw or pawl to hold it open or closed at will. The way this is operated is shown in the engraving. When the little engine is started the discharge valve is opened and a stream of water turned into said discharge pipe. As the ashes are hoisted and dumped into the discharge chute they are quickly forced overboard, the whole operation being performed quickly and without noise. The apparatus is also utilized for another purpose. At a point above the deck, where the donkey boiler is placed, a door is made, and a plate is fitted into the chute so that when in place it extends upward and backward from the lower edge of the door-opening as an incline. This device is used when ever it is desired to hoist coal from the fire-room bunkers for the use of the donkey boiler, and the coal, being taken from the receiver, is

carried up by the buckets and discharged into the chute, flowing down the inclined plate referred to, which directs it outward through the door opening on to the deck. When ashes are to be removed the plate is taken out and the door closed.

The device has been found to work very well indeed in practice, saving a great deal of labor and

doing away with dust and noise. The writer has examined it on board of the steamers, and those in charge speak very highly of its efficiency. No ashes dirty up the decks or fly in the eyes of passengers, and no men have to stand on deck to dump buckets into the chutes. The discharge is under the water line, as shown, so no dust is created.



SPRECKEL'S IMPROVED ASH HOISTING AND DISCHARGING APPARATUS FOR STEAMSHIPS.

main boilers of the steamer. The gear wheel for revolving the belt-drum is shown in the engraving, as is also the small engine.

The upper end of the discharge chute or pipe has a hood extending upward, and curving partially over the upper bucket roller, so as to insure the discharge of the contents of the buckets into the chute without scattering. The chute

is apt to clog when discharged through this chute, an opening or passage is made into it, entering on a line with the direction of the lower portion, and a water pipe, as shown, connects with it with a valve, through which a body of water from the pump may be discharged through the pipe, and forcibly clear it or prevent any lodgment of material within it.

Examinations of Fertilizing Materials.

University Experiment Station—Bulletin No. 8.

1. *Analysis of the Ash of Spent Tan-bark.*—This material is sometimes obtainable in considerable quantities from neighboring tan-yards; and the sample was furnished by Mr. John H. Wheeler, Secretary of the Board of Viticultural Commissioners, with a view to ascertaining its manurial value and especially its adaptation as a fertilizer for vines.

The ash contained some unburnt matter which was not determined directly. In the table below, column 1 shows the composition of the material after drying at the boiling point of water; column 2 shows the composition as it would be if burnt completely and at a higher heat, so as to "burn" the lime into quicklime:

	Per Cent.	Per Cent.
Insoluble residue.....	5.68	8.87
Potash.....	2.90	4.53
Soda.....	3.36	5.25
Lime.....	41.40	64.69
Magnesia.....	5.02	7.55
Iron and alumina.....	4.67	7.40
Br. ox. manganese.....	1.67	2.48
Sulphuric acid.....	.26	.40
Phosphoric acid.....	.47	.73
Carbonic acid.....	27.67	.....
Organic matter and loss.....	8.26	.....
Total.....	100.00	100.00

It will be noted in column 1 that lime (in the form in which it exists in air-slaked lime, in combination with carbonic acid and water) constitutes the bulk of this ash, while the ingredients of chief importance as mineral plant food, viz.: potash and phosphoric acid, are present in small amounts only as compared with the ash of oak wood, or of fresh bark. This change is partly the result of the leaching the bark has undergone in the tan-pits, partly that of the use of lime in dressing the hides. Assigning to the 58.0 pounds potash and 9.4 pounds of phosphoric acid contained in a ton of the raw ash, the valuation usually made in the case of commercial fertilizers, it would be worth about \$6.36 per ton on that score; but where lime is needed it might be valued from eight to ten dollars for actual use. Potash is especially needful for the maintenance of production in older vineyards, but as a rule it is abundant in fresh soils in California; while phosphoric acid is, on the whole, but in small supply.

2. *Analysis of the Lime Refuse from the Alcarado Sugar Works.*—This is the by-product of the defecation of the beet juice with lime, and, of course, it consists in the main of lime in the air, and water-slaked condition. The object of the analysis made at the suggestion of Mr. John L. Beard, of Centerville, was to ascertain the amounts of phosphoric acid and ammonia, or other nitrogen compounds that have been taken up from the beet juice and would be in a highly available condition as fertilizers. The substance is a grayish paste, of an offensive odor, in which the presence of ammonia is, however, easily perceived. Hence it is obviously losing in manurial value continually, as it lies exposed to the air. In drying it for analysis, this loss, of course, was also increased. The determination gave:

	Per Cent.
Phosphoric acid in air-dried mass.....	1.57
Ammonia (determined as nitrogen).....	.67

From the condition of the mass when received, it may be inferred that quite one-half, if not more, of the nitrogen originally contained in the fresh mass had already evaporated in the shape of ammonia gas.

Considering that the two ingredients thus derived from the beet juice are present in a highly effective condition, it is certainly worth the while of those living near the factory to haul this refuse upon their fields, or to use it in composting, especially with the tule muck, or marsh soil, which will thus be sweetened by the lime, and will serve to retain the ammonia. The latter object may also be attained by using some plaster in the compost. Aside from the lime, the value of the dry material, as shown in the analysis, is about eight dollars per ton, according to the usual schedule.

Examinations of Soils.

Granite Soil from the Foothills of the Sierra Madre, Los Angeles County.—Sent by Mr. Wm. A. Spaulding, of Sierra Madre, who says that such land forms a kind of sloping mesa, "the natural growth being greasewood, white sage, sumac, lupins, etc., with an occasional sycamore. The brush is naturally heavy, and often swept by fires. The soil is easily cultivated, and does not differ obviously from the subsoil; drinks up all the water that can be put upon it, but retains moisture well during the hot summer. Deciduous trees and grape vines flourish without any irrigation, provided they are fairly cultivated; citrus trees do finely, but it is not well suited to grasses, clovers, corn, grain, root crops or garden vegetables." It is especially desired to know the cause of the latter defect and its possible remedy.

This soil is rather coarsely granular or sandy, the grains being obviously largely granite debris. This fact renders a full analysis unnecessary, since such soils are known to contain abundance of potash and, in California, of lime. A special determination proved that it also contains an adequate supply of phosphoric acid. It is therefore obvious that its defect is a mechanical one, and this was verified by me-

chanical analysis, the soil being passed successively through sieves of increasing fineness, upon which there remained the following percentages of sand too coarse to pass:

	Per Cent.
Sieve with meshes of 1-12th inch retained.....	30.4
Sieve with meshes of 1-25th inch retained.....	20.6
Sieve with meshes of 1-50th inch retained.....	17.0
Sieve with meshes of 1-60th inch retained.....	12.3
Finer than 1-60th inch, or "fine earth".....	19.7
Total.....	100.0

This fine earth was found to contain 4.7 per cent of true clay, which referred to the entire soil, shows the latter to contain only about nine tenths per cent of clay.

This fact explains fully why the shallow-rooted grasses, vegetables, etc., will not grow well on this soil. The surface soil, upon which they mainly depend for their nourishment, is too coarse to afford it, contains too little fine matter from which their roots can draw sustenance, and is also too open to the dry summer atmosphere. The fine matters are constantly carried by the rain or irrigation water to greater depths, where the roots of trees, vines and tap-rooted plants can follow them, and find moisture at the same time.

It is not easy to suggest a remedy for this state of things that would be applicable on the large scale. For small garden plots, flower-beds, etc., the hauling of a more clayey soil on the surface may be feasible. Another expedient is the one employed by the Arabs, viz.: to plant in pits so as to bring the shallow roots within reach of a more compact soil and abundant moisture. But for practical purposes, the culture naturally adapted to these circumstances will have to prevail.

Soil from Capay Valley.—Sent by Mr. E. W. Thomas of Capay. This soil is evidently old alluvium of Cache Creek, substantial but light and somewhat gravelly, with a gravelly subsoil. Mr. Thomas desired to have some definite data as to its adaptation to fruit culture, and prospective durability. The only points needing determination in this case were the amounts of lime and phosphoric acid present, which were found to be as follows.

	Per Cent.
Lime.....	.735
Phosphoric acid.....	.164

As the rocks of the valley are known to contain abundance of potash, and the above percentages are quite satisfactory, there can be no doubt of the adaptation of the soils to the purpose intended, nor of fair durability.

Berkeley, March 6, 1884. E. W. HILGARD.

EUREKA MINERS' UNION.—The Miners' Union of Eureka went to the Home Ticket mine and requested all the non-union men to quit work. These men, who were working on tribute, came up from underground and quit work. The *Sentinel's* reporter, later on in the afternoon, called at the Ruby-Dunderberg office on South Main street, where he met Mr. Rickard, Mr. Kermeen and Mr. Wilson, respectively President, Superintendent and Secretary of the Home Ticket Company. Mr. Rickard, in response to the reporter's inquiry as to the facts of the case, said there had been no "trouble." He said that Mr. Kermeen and he were at the mine, towards noon, when the members of the Miners' Union came to the works. The officers of the Union came to him and told him their mission as stated above; and said that the Home Ticket men had promised to come over and join the society last Friday night. He says he told them that he had no objection to his men joining the Union, but he told them that if they shut down the mine and kept it idle till Friday night such detention would involve a loss to his company, and he would hold them responsible for the damages incurred. He was willing, however, in order to give his men a chance to go over to Ruby Hill and join the Union, that the mine should be shut down for one day, yes, today. Mr. Rickard said he had some further discussion with the officers of the Union in regard to the workings of their organization, which, perhaps, it would be of no advantage to publish. Mr. Rickard says that the men in the Home Ticket mine were to have become members of the Union at its last meeting, Friday evening, but they say the snow was so deep and the weather was so bad that they could not well walk over to the place of meeting. This is about the whole story as to the facts of the case. As we understand the matter, the sixteen Italians working on contract in the Home Ticket mine were to join the Miners' Union yesterday afternoon—which would remove all cause of disagreement or controversy so far as this particular case is concerned.

TUNNEL MINING ENTERPRISE.—The tunnel mining enterprise at Hoyt's old crossing on the South Yuba is now in full operation. About half of the water that comes down the channel (between 160,000 and 200,000 inches in all yesterday) passes through the tunnel and carries over the sluices an immense amount of debris all of which is supposed to contain more or less gold that will be caught and retained in the quicksilver.—*Nevada Transcript.*

MINERS going to the Coeur d'Alenes are giving Belknap the go-by and saving money and time. The road from that point to Eagle City is impassable because it is not yet finished, and a few days of warm weather will render it necessary to put on a line of mud scows across the bog between Belknap and the mountains.—*Butte Leader-Mountain*

Coeur d'Alene Mining Laws.

Following is a copy of the by-laws adopted by the first miners locating in the new regions: Local laws of the Coeur d'Alene mining district located on Pritchard and Eagle creeks, Shoshone county, Idaho Territory:

By-Laws:

SEC. 1. All locations on lodes of veins of quartz to conform with the United States laws of May 10, 1872, as nearly as practicable, viz.: Fifteen hundred feet (1500) in length, by six hundred feet in width.

SEC. 2. Placer mining claimants shall be allowed twenty acres, to be located so that the length shall not exceed eighty rods.

SEC. 3. Each location shall be represented by the locator or his authorized agent in locating and recording.

SEC. 4. No person shall be restricted to one claim, but may locate one claim in any stream or gulch where vacant ground may be found. But no person shall be allowed to locate more than one claim on the same stream or gulch. Persons shall not be prohibited from holding claims acquired by purchase.

SEC. 5. Claimants shall have one year from the first of January succeeding the date of location to work their first annual assessment which shall be one hundred dollars. Each year thereafter claims shall be represented by twenty dollars worth of labor each month after the first of June until the first of November after the first year's assessment. Furthermore, all claims shall be considered laid over from the first of November to the first of June. All necessary work, such as making roads or trails, building houses, or any improvements in opening or working a claim, will be allowed five dollars per day as assessment labor.

SEC. 6. Claimants will be required to record their claims in the district record within fifteen days from the date of location.

SEC. 7. The oldest or first claimants shall have the first privilege of water, but shall not prohibit others from using the surplus water, and all claimants shall be required to return the water to the channel of the stream for the benefit of those below.

SEC. 8. Several miners may form a company for the purpose of opening and working mines in placer claims, when such claims are contiguous, and the labor performed by said company shall represent their several claims, although the amount of labor for the convenience of opening and working may be done on one claim.

SEC. 9. Difficulties arising between parties in the mining district shall be settled by arbitration, each disputant to be allowed an equal number of arbitrators, and in case of a tie on decision said arbitrators will have power to call an assistant.

SEC. 10. All claims located prior to the date of the adoption of these by-laws shall be respected just the same as those made after said date.

SEC. 11. The records of the Coeur d'Alene Mining District, in Shoshone county, Idaho Territory, shall be kept at the house of A. J. Pritchard, Recorder, near the confluence of the Eagle and Pritchard creeks.

SEC. 12. On the written application of 12 or more miners, the Chairman shall cause three notices to be posted up in three conspicuous places, giving ten days' notice of a meeting, said notices to specify the object and business to be transacted at such meeting. To make any changes in the present by-laws between the 1st of November and the 1st of June the following year shall be illegal.

SEC. 13. These laws shall take effect from this date, and any laws or regulations previously enacted that conflict with these laws shall be considered repealed.

Routes of Travel to Coeur d'Alene.

C. F. McGlashen writes to the *San Francisco Bulletin* as follows:

Freight has generally been brought to this region over the Evolution trail, via Mission City and Fort Coeur d'Alene, from Spokane Falls and Rathdrum, the entire distance being about one hundred miles. Sleighs carry freight to Evolution, and pack trains convey it thence to Eagle City. The trail has usually been kept open, no blockades having lasted longer than a few days at a time. A weekly mail is carried by two brothers over this route, each letter costing fifty cents to the party who receives it. At one time the mail carrier's feet were frozen so badly that he was compelled to stop work for five weeks. Every man on the trail, that trip, had either feet, hands or ears frozen. The Heron Siding trail was used somewhat by footmen coming to the mines, but upon the opening of the Trout Creek trail, about the middle of January, nearly all the travel changed to this route. Seven men have just come in from Heron's Siding who were seventeen days on the road. They were caught in storms, and suffered considerably from lack of food and exposure. The Trout Creek trail, however, has been constantly kept open by the great number of men who travel it each day. Freight in considerable quantities is brought over this route in hand-sleds and toboggans drawn by men. A toboggan is a board five or six feet long, with the forward end curved like a sled runner. From 125 to 200 pounds are drawn on a toboggan by one man. The trail is very difficult, running along hillsides and over lofty mountains, yet a hundred toboggans and twice as many men are traveling it daily. Men have

walked the distance from Trout Creek to Eagle City, thirty-five miles, in less than eleven hours, but ordinarily it takes two days. Stations are situated every few miles, where food and shelter can be obtained. A toll of fifty cents is collected from each man traveling the route. A trail and wagon road are projected from Belknap, and the Northern Pacific are booming this route. It is not yet open for travel, however, and the universally popular road is a rival to that from Belknap, leaving the railroad a few miles further east, at Thompson's Creek. A large force of workmen are pushing a good road into the mines from Thompson's, and have about eighteen of the thirty-five miles completed. It is generally conceded that unless had weather prevents this road will be completed by the 10th of March, and will be the road over which the great bulk of freight and travel will come. All depends, however, on the weather. The North Fork trail reaches Eagle from Spokane and Rathdrum. It is not much traveled at present because of the thirty or more crossings of the river which have to be made. As soon as high water comes in the Spring this route is destined to be very popular, because steamboats can run from Fort Coeur d'Alene on Lake Coeur d'Alene, and up the River Coeur d'Alene to within five miles of Eagle City. The Fort is only eleven miles from Rathdrum, on the Northern Pacific, and a branch road has been projected connecting these points. Two steamers have been completed for travel on the lake, and the Government steamer at the Fort will also be used in transporting freight and passengers. Tickets from Portland to Eagle City are offered for sale on and after March 16th. Large numbers of men are engaged in opening a road from Rathdrum, another force has been sent from Spokane Falls to bring a road from Jackass Prairie, and a third will soon be at work cutting away a large drift in the North Fork so that boats can ascend.

The Mining Town of Anaconda.

The *Inter-Mountain* says: During the coming season of activity Anaconda will be the liveliest town in the Territory. At least 1,200 men will be given employment there, and the disbursements for wages will be larger than in any other burg in Montana, butte alone excepted. It has been reported in some journals that Anaconda has experienced a season of depressing dullness since the temporary suspension of operations by the company a few months ago, but the fact is that the town has been lively all winter, and that every business house there has made money. Last month the sum of \$40,000 was paid out for wages and supplies, and this month the disbursements will be greatly increased. From now on, it is stated to be the intention of the company to increase the working force as fast as men can be profitably employed, the intention being to have the concentrator and smelter in active operation before the snow flies next fall. The cost of the works complete will not fall far short of \$1,000,000. Their capacity will be the largest of any reduction works of the kind in the world.

The town of Anaconda is a wonder. Located near the mouth of a canyon, and on a plain almost as level as a billiard table, its broad and regular streets, substantial business houses and general look of solid prosperity impart to it the look of a town established for years. Yet less than twelve months ago the site of Anaconda was covered with willows, and no one resided within half a dozen miles of the spot. To-day there are 500 people there, and when the season fairly opens there will be between 1,500 and 2,000 permanent residents. The smelter is not the sole support of the town. It is the trade center of Upper Deer Lodge valley, and as the demand for farm products will be great, the farmers will, of necessity, transact all their business at Anaconda. There is no town in Montana with a more assured and prosperous future.

A Test for the Hydraulic Pumps.

The *Virginia Enterprise* says: Yesterday morning at one o'clock a blast in the face of the north drift on the 2600 level of the Savage started a flow of from twenty to twenty-five inches of water. This water flowed out to the Combination shaft with a rush, owing to the clogging of the drain boxes, and the debris collecting here and there forming little temporary dams. This sudden increase of water was a good test of the hydraulic pumps, and they performed splendidly, easily handling the water. Though the men who were at work at the bottom of the Combination shaft below the 2600 level were for a time drowned out, the pump was drained, and they resumed work again last evening.

The water streak tapped seems to run up to the 2400 level, as the flow of water there decreased about fifteen inches. It must be that a crevice of some kind was tapped, as the water would not have rushed out so suddenly from mere wet ground. There are reports that some quartz was brought out by the water, but we could not learn anything regarding its value. Such sudden flows of water generally come from the vicinity of belts of quartz. The place will perhaps be explored when it dries out.

On the 2200 a very heavy flow of water was struck some years ago, and gave much trouble until the drift whence it came was bulkheaded. The place is now perfectly dry, but thus far it has not been explored, and the hole from which the water came examined.

MECHANICAL PROGRESS.

Expansion of Metals in Melting.

A foreign journal notes the following experiments on the expansion of metals at melting points, and the comparative rates of cooling of certain alloys and tin. The experiments were made by Herr E. Wiedemann, and the dilatometer method was employed. The substance was inclosed in a glass cylinder, tightly fitted, at the upper end of which a capillary tube was affixed.

The most convenient liquid for filling the apparatus was found to be oil, which has the advantage of not evolving air when heated to 200; moreover, it does not possess an appreciable vapor tension at that temperature. When heated above that point, the oil attacks the metal. The rate of cooling was determined by heating the metal to 260 in an iron vessel. A thermometer, protected by a glass cup filled with oil, was inclosed within the molten mass. The whole apparatus was then immersed in a double-walled metallic vessel, the intermediate space between the walls being filled with water. The intervals of time required for cooling five degrees were carefully measured; the reciprocal value for these times may be taken as a measure for the velocity of cooling of the metal. In three experiments it was found that tin on melting expanded in volume 1.76, 1.69, 2.20 per cent. These results are in direct contradiction to those of Nies and Winkelmann, who melted a large quantity of the metals, and then dropped in a solid fragment of the same metal, and observed whether this fragment floated or sank. But the author points out that in this method it would be exceedingly difficult to avoid convection currents, which would be liable to carry up the solid fragments to the surface in the center of the vessel.

Experiments also proved that soft solder expands almost 2 per cent of its volume in melting. An alloy of bismuth and lead, corresponding to $Pb_{45}Bi_{55}$ of sp. gr. 11.4, begins to show an increase of expansion at about 120°-136°, which reaches its maximum at 180°.

The results of these experiments show that these alloys contain a definite compound of composition between $Pb_{45}Bi_{55}$ and $Pb_{50}Bi_{50}$, whose melting-point is about 125°, and in which the excess of one metal, lead or bismuth, as the case may be, dissolves. For equal increments of temperature, the proportion of the metal dissolved rapidly increases. From the changes of volume at temperatures above the first melting-point, one can conclude whether the metal in excess expands or contracts on melting. The experiments would seem to indicate an expansion of lead and a contraction of bismuth, a result in accordance with previous observations. For example, the alloy $Pb_{45}Bi_{55}$ consists of an alloy of low melting-point, in which the excess of bismuth dissolves; if it be gradually warmed to 120°, the alloy and the excess of bismuth expand regularly. At this temperature the alloy melts with marked expansion and contains the solid bismuth in suspension; above that point the bismuth gradually dissolves and melts.

Papered Veneers.

About the year 1868 it was discovered that it was possible to make wood veneers of such extreme thinness that in some cases it would take 175 of the sheets piled upon each other to make an inch. These were handsome, and could be successfully applied to a surface, but they failed in one most important particular—they would crack and curl. It remained for Charles W. Spurr to devise a plan whereby this defect was remedied. That gentleman found upon experiment that when this thin wood was expanded to its natural capacity, and in that condition applied to a piece of paper, it ever afterwards remained in that condition, neither shrinking nor expanding after it had been applied as a veneer. This is the process: The logs, which embrace all the many kinds of rare and handsome woods, are halved or quartered and placed in a large tank, where they are steamed for the purpose of expanding the water already contained in the sacs of the wood. The log is taken out in this moist condition and bolted upon a revolving section of a ponderous machine, which weighs over 30 tons, and which, at every revolution, throws off a thin board 12 feet long and from 1.90 to 1.75 of an inch in thickness. After cutting, the wood is taken still wet and applied to a sheet of paper. The paper is also wet at the time. After this papered veneer is dried it is a perfect compound and cannot be separated. After the wood is backed with the paper it is hung up and dried, and is then ready for use. The uses to which these paper veneers can be put are many, and the article has grown steadily in popular favor. It makes a handsome covering for the walls of rooms. It can be attached to the plastered wall, and after it has received the finish it can be washed whenever necessary. The beauty of the wood improves with age; it even strengthens the walls, while steam or furnace heat, dampness or frost have no effect upon it. This product is excellently well adapted to the manufacture of furniture, and the advantage which the veneers have been found to possess for this kind of work may be briefly summed up as follows:

No waste or injury in storage or careless handling; many sheets can be cut at once, without ruining brittle wood; 100 pounds of glue will lay as much surface as 250 with ordinary veneers, twenty minutes under pressure, instead of twelve hours, keeping the press going all day; no delay for glue to set, but being immediately sand-papered, instead of planing, scraping and sand-papering; less than one-half the amount of filling and finish, with marked clearness of color and brilliancy, and durability under circumstances fatal to the ordinary veneers and finish, from the absence of glue in the veneer of finish. Still another use to which paper veneers may be put is in the binding of expensive books, such as albums. Experiments are constantly making which widen the sphere of usefulness of this article. — *Lumberman's Gazette.*

THE SERVICE OF CAR WHEELS.—The following facts concerning the relative durability of steel tired and cast iron car wheels are taken from a paper read by Mr. John M. Ford at a meeting of the Master Car Builders' Club, held at Boston, January 30th, and are based on statistics from the passenger coach service of the Boston & Albany railroad for the past year: During the year 1883, 180 Hartford steel-tired wheels had been removed as worn out. The average mileage was 245,980 miles, the minimum being 63,500 and the maximum 470,000 miles; the average time in service seven years, eight months and three days. Out of 180 wheels worn out the great majority, 131, ran over 200,000 miles, and only about three per cent of the total number ran under 100,000 miles. The average mileage of worn-out cast iron wheels removed during 1882 was 29,074 miles, and it would there fore appear that a steel-tired wheel will outlast eight chilled wheels, which latter only ran on an average 332 days. Speaking of the best material for ties, Mr. Ford said crucible steel of good quality, containing about one per cent of carbon, is four times as strong as cast wheel iron, and machinery steel containing about thirty per cent of carbon gives nearly the same breaking strain with a fibrous fracture. This metal is too soft for wheel tires, but steel made in crucibles from Swedish iron, with seventy-hundredths to eighty-hundredths per cent of carbon added, hammered and rolled, will produce a perfectly safe and durable tire.

ONE ADVANTAGE OF AMERICAN MACHINERY: Lionel Garden, British Consul in Mexico, says in a recent report: "In a general way, it may be said that it is the weight of English machinery which places it at such a disadvantage when compared with that from other countries, and especially from the United States. In Mexico, owing to the enormous freights and the expense of handling, it often happens that bulky articles of no great value have to pay for transport alone from the factory to the city of Mexico from 50 to 100 per cent of their original cost, independent of the duties (if the goods are dutiable) and other charges and commissions, and independent also of the further cost of transport to their ultimate destination. It stands to reason, therefore, that the lighter a machine can be built, without prejudice to its strength and durability, the better it is suited to this market, and the position that American machines occupy here to-day is due, in very great measure, to the recognition of this fact by American manufacturers."

IS PUDDLING NECESSARY?—A comparatively new process in the manufacture of low carbon Bessemer steel, says an exchange, was tried a short time ago at the works of the Pittsburgh Bessemer Steel Co., which, if after sufficient trial, is found successful, will completely revolutionize the work of puddling, doing away with that process altogether. Heretofore but little Bessemer steel has been made below a certain degree of carbon, which renders it impracticable to use for many purposes for which wrought iron is employed. But by late experiments under the present management, by the above works, steel is expected to be made as low in carbon as 1.600th of 1 per cent, which, the superintendent states, will answer all the purposes for which wrought iron is used.

STRAIGHTENING SAWS.—A late improvement consists in tempering and straightening saws at one operation. This is done by heating the saws to a proper degree, and then pressing them by a sudden and powerful stroke between two surfaces of cold iron, a drop press being employed for the purpose. The use of this mechanism effects a very considerable economy in the manufacture of the article.

COST OF PIT IRON.—The actual cost of making a ton of iron in the Lehigh Valley, Pa., is put down by Mr. McCreat, chemist of the Geological Survey of Pennsylvania, at \$20 38, itemized as follows: Ore, \$9 34; coal, \$5 30; limestone, 77 cents; labor, \$2 33; incidentals and repairs, \$2 64.

DIAGONAL JOINTS FOR BELTS.—Instead of making square joints in belts where laps occur, why not run them diagonally? There would be more holding surface in the lap, and a gradual strain on it instead of a double one, where it passes over the pulley.

SCIENTIFIC PROGRESS.

Some Recent Scientific Discoveries.

Mr. Hughes' researches, which tend to show that a magnet is made up of a great number of atomic magnets or molecules, is, perhaps, the most interesting of the many papers on electric science which have been published in the course of the last twelve months. Several new comets have been detected, and, as one of the conclusions derived from the recent transits of Venus, it is announced that the sun's distance from the earth is 92,700,000 miles.

Dr. Hughes has succeeded in photographing the sun's corona by producing an artificial eclipse, and, among other applications of photography, a compass has been devised by which a ship's course can be unerringly chronicled by aid of the sun, thus no longer rendering captains and courts of law dependent on the veracity of steersmen or the entries in log-books.

Prof. Langley has shown that the normal color of light is not white, but bluish, and in chemistry, which, like physics, has for the most part been "practical" in its labors, a new species of explosive—one of the dynamite family—known as "panclastite," ought to be credited, or discredited, to M. Turpin.

In biological science, though the amount of work done has been considerable, there is less of popular interest to note.

The curious fresh-water jelly fish which appeared so mysteriously in the Victoria tank in the Royal Botanic Gardens, in Regent's Park, has again shown itself; and, as indicating that the botanist has not yet exhausted the globe, the island of Socotra, in the Red sea, has yielded to one visitor no fewer than thirty-seven new species of plants. But perhaps the most important discovery in biology which 1883 has to boast of is that which tends to prove that the protoplasm in cells passes through their walls, uniting them with other cells, contrary to the view formerly held. Should this statement be generally confirmed, it will rank among the greatest of the year's achievements. — *London Standard.*

The Growth of Electrical Science.

At the first meeting of the current session of the Society of Telegraph Engineers and Electricians, held on January 10th, Professor W. G. Adams, F. R. S., in his inaugural address, delivered in the lecture hall of the Institute of Civil Engineers, speaking upon the subject of "The Rapid Growth of Electrical Science," said that 100 years ago Cavendish, though far behind our age, was much in advance of the men of his time. He quoted figures to show that the result which Cavendish had obtained in his experiments in connection with the measurement of electrical force were remarkable for their accuracy as shown by their close approximation to the results recently obtained by the aid of the efficient instruments that were now used in the solution of such problems. The progress of electrical science had been marked by steps similar to those which were found in the history of other sciences. The gradual collection of observation of facts gave rise to new theories and new inventions, which in turn were the sources from which other facts, theories and inventions were derived, but the rapid progress of the science was largely due to the fact that it had been the pursuit of men like Faraday, Maxwell, Thompson, Siemens and others; men who had not only the capacity to perceive what was required, but likewise the ability to discover and supply that which was needed. In illustration of this remark, Professor Graham spoke at some length upon the leading inventions of Faraday, Thompson and Siemens, and said that the importance of the results derived from the introduction of accurate instruments of measurement was clearly proved by the history of the science during its most recent period. Referring at the end of his address to the principal events of the year in connection with electrical science, the Professor gave some technical details of the manner in which electricity had been utilized as a motive power for tramways and railways.

A Pocket Apparatus for Air Analysis.

Since the unwholesomeness of the air in a room or hall is nearly proportional to the percentage of carbonic acid (carbon dioxide) in the air, Dr. Wolfert, of Kaiserlautern, has devised a very simple apparatus for estimating this suspicious constituent approximately, to be used in school rooms, sleeping rooms and public halls.

A small glass cylinder is filled to a certain mark with perfectly clear lime water, a very cheap article to be had at any drug store, or easily made at home. He then takes a small india-rubber ball or bulb, with a glass tube attached. On squeezing the ball until all the air is expelled it will, of course, fill itself with the air of the room. The tube is then allowed to dip into the lime water, and the air made to bubble through it slowly but steadily, squeezing the ball. When all the air is expelled, remove the tube from the lime water and allow the ball to fill again, taking care that no lime water is sucked into the tube or bulb. This is

repeated until a precipitate of carbonate of lime is formed which obscures the numbers on the bottom of the cylinder. The number of times it must be repeated to effect this end increases with the purity of the air. Accompanying tables give the percentage corresponding thereto.

If the lime water is rendered so turbid as to be opaque by less than ten repetitions, the air is very bad, and cannot be breathed with impunity. If it requires from ten to twenty repetitions, a person may remain there for a short time. When more than twenty repetitions are necessary, the air is good enough for ordinary purposes. In sick rooms it should require at least thirty, and in contagious disease, forty to fifty. The purer the air, of course, the longer time the tests will take.

A NEW COMPASS.—M. Mascart, the well known electrician, has devised a new compass which finds the magnetic meridian by the well known experiment of moving a coil of wire across the lines of magnetic force of the earth and inducing a current in them. M. Mascart employs an azimuth circle on which is mounted a ring movable around the horizontal axis. The angle, made by the ring with the horizon, is measured by a vertical circle. A coil of 0.12 meters in diameter is carried by the ring and can turn around an axis perpendicular to that of the ring. The size of the apparatus is not greater than an inclination compass. It acts on the principal that when the axis of rotation of the coil is in the magnetic meridian the induced currents in the ring when rotated will be nil. A sensitive galvanoscope is employed to show the induction current. In using the apparatus a series of trials show that the axis of the ring is perpendicular to the magnetic meridian. A second series place the axis of rotation of the coil in the line of the inclination needle. The observation, with checks, occupies half an hour, which is less time than is necessary to find the inclination by a magnetic needle. From observation made at the Observatory of the Parc Saint Maur, by M. Moureaux, the new compass seems to be as correct as the inclination compass.

A VALUABLE PHOTOGRAPHIC IMPROVEMENT.

An invention has quite lately been perfected by Mr. Edward W. Fell, of Cleveland, O., which, it is claimed, ranks with the electric light and telephone. The invention consists in taking absolutely permanent pictures upon any substance whatever having a smooth surface, instantly, by the action of electricity, upon a sensitive coating, and at an expense not exceeding one cent per picture. Photographs on wood are not only perfect in outline and finish, but possess a peculiar softness not obtainable by any other process. This invention opens an entirely new and distinctive field in the art of photography, and will work a revolution in various branches of business into which it will enter more or less. None of the present processes are used; and it is not intended to interfere with the portrait work of the average photographer. The engraver upon wood, copper or shell need no longer consume time and patience in obtaining a defective counterpart of the object to be engraved, but instead, can, at a trifling expense, obtain a beautiful photograph directly upon the wood or metal upon which the engraving is to be made.

VELOCITY OF TIDAL WAVES.—M. Errington de la Croix has calculated the velocity of propagation of the tidal wave caused by the volcanic eruption of Krakatoa. The final moment of the explosion was about 12 minutes to noon, when a gigantic wave was formed in the Straits of Sundra. But the same day at 1:30 P. M., a tidal wave was felt on the coast of Ceylon, notably at Point de Galle. Assuming that this was the same disturbance propagated across the 1800 miles of sea dividing Point de Galle from Sunda, M. de la Croix calculates the velocity of propagation to be some 1,200 miles per hour, or 1,804 feet per second. Further data from the Island of Mauritius affords a check on this result. Here the distance is 3,300 miles from Sunda, and the tidal ebb was felt at 2:15 P. M. Hence the speed per second works out as before—1,804 feet.

CONDENSATION OF CARBONIC ACID GAS UPON THE SURFACE OF GLASS.

Prof. Robert Bunsen has recently published the results of his investigations upon the film of carbonic acid that adheres to the surface of smooth, clean glass. He found that the quantity gradually increased from year to year, and more rapidly in cold weather than in warm, but change of barometric pressure makes no difference. In three years over 5 c. c. of carbonic acid gas had attached itself to the square meter (1,600 inches) of surface, and had been compressed to 0.05 c. c., which represents the very considerable pressure of 135 atmospheres. Bunsen thinks that there can be no doubt that it exists on the surface in a liquid form.

FIVE NEW COMETS.—Dr. Gould, Director of the Observatory at Cordova, Argentine Republic, telegraphs to the Minister of Instruction at Buenos Ayres, December 15th, that he observed five comets, all small ones. The Buenos Ayres *Standard* supposes that this may explain the unprecedented heat felt in the river Plate, 101° Fahr. in the shade at Buenos Ayres, where the glass rarely marks over 92 in midsummer (December-January.)



W. T. DEWEY

W. B. EWER.

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G. M. STRONG.

SAN FRANCISCO:

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See Advertising Columns.

Passing Events.

Some of the men who have gone to Cœur d'Alene send back word that much exaggeration has been indulged in by those who have told the stories we have been reading for some time. Of course there is gold there, but it is not probable that the whole country will pay to locate.

The striking of the lead in the tunnel of the famous Drum Lummon mine is the most important strike yet made in Montana, considering the fame of the Drum Lummon and the figures at which it sold about one year ago. Had this tunnel failed to develop anything, all mining enterprises in Montana would have received a severe blow. As it is there are many spurs and extensions of this wonderful lode which soon will be developed, and Marysville will be a second Butte, no doubt in a couple of years.

The broken railroad connections have been repaired, and trains are running to Southern California on time again. The fine weather is favorable to mining operations and miners are taking advantage of it.

COPPER.—The latest Liverpool quotations for copper are as follows: Chili bars, £55 7s. 6d, sharp cast; ore of 25 per cent and good quality, 11s. per unit; Chili regulus, 11s. 3d. per unit. The total visible supply is 46,036 tons fine, against 43,658 tons fine on Feb. 1st. The English imports for the year so far aggregate 17,428 tons fine.**LEAD** in Liverpool has fallen to £11 15s. 0d. to £12 for English, and £11 10s. to £11 12s. 6d. for Spanish.**ANTIMONY** is selling in Liverpool at £44 to £46 for French Star.

A New Quartz Mill.

A representative of the PRESS examined, in operation this week, at No. 52 Bluxome st. in this city, a new form of quartz mill, designed by Frank A. Hill. The machine is quite simple in construction and operation. It is circular in form. In a suitable bed is a circular V shaped groove or channel, open at the bottom, in which are nine steel rollers or wheels of corresponding shape on their edges. These rollers or wheels set on edge in the channel. Above them is a large open casting having an inverted V-shaped circular groove, in which the upper part of the rollers fit. This upper casting is given a rotary motion by means of an upright shaft and gearing similar to that of an ordinary amalgamating pan. As the weight of this casting rests on the upper edges of the rollers, they are revolved rapidly in a circle in the grooves provided for them. The upper casting is open at the top, and ore, which is first passed through a rock-breaker, is led into the machine by a suitable spout, with a stream of water. As it falls into the interior it finds its way into the V-shaped channels, and the broad faces of the rotary rollers crush it. The centers of these rollers are open, to allow the quartz to have free motion all over the machine. The ore is crushed both in the lower and upper channels. The rollers run free, but close together. Around the series of rollers is a circular screen, through which the pulp passes, the discharge being all around the mill. Below the screens is a circular apron, on to which the pulp falls, and which is provided with amalgamated plates. From this the material falls into the usual sluices.

Provision is made to add more or less weight to the upper casting, so as to increase the capacity of the crushing rollers. A small derrick is arranged to handle these extra weights, and to lift the casting when the mill is to be cleaned up. The V-shaped channels have removable dies made of steel, and the rollers themselves are made of steel. One of these machines are now being made ready to run at a mine in Tuolumne county, in this State. The weight of the whole thing is about 3,000 pounds. It was crushing ordinary granite through a 40 screen when we saw it at work, and seemed to be getting it through pretty fast, running at a speed of 53 revolutions per minute. Mr. Hill will be glad to show the machine in operation to all persons interested in such matters, and they can see for themselves the work it can do. He is confident that the machine has a large capacity, and is a practical invention, in which opinion many mining men who have seen it concur.

Manufacturing Interests.

We have several very important things to learn, as a community, before we will be as prosperous as we should, considering our resources. We want to make up our minds to manufacture everything we can, and to let as little of our raw material go away as such, as may be. When in the Southern States they grew cotton and sugar cane, and sent the former all off to be made up and the latter to be refined, they were always poor. Now they manufacture cotton yarn and goods and refine their sugars, and are prosperous.

We ought here in California clean and prepare our wool, and make it up into yarn, hosiery, clothing and blankets. Our hides ought all he tanned, made into leather, and into shoes and harness; and our excellent native woods should be made up into furniture, etc. We might go on and mention a score of products which we now send away, and the profits of manufacture of which accrue to others.

We are already seeing that it will pay us to make flour instead of sending away wheat, for the profit of manufacture remains at home. Immense mills are now being made at Carquinez Straits for this purpose. There are also woolen mills, tanneries and shoe factories. But the people do not appreciate their importance as factors of progress, nor does the number of factories increase as fast as it should. The geographical advantages of San Francisco, and the resources of the surrounding country, ought to make this city a larger manufacturing center than it has so far become. True, we see with satisfaction the strides it has taken of late, yet there is much room for improvement. The establishment of every factory, no matter on how small a scale, is one more step in industrial progress. Around each one gathers a little crowd of interested workers, and these small communities enrich the large one and make prosperous manufacturing centers.

Foundry Notes.

A Sun Engine.

At the California Machine Works (W. H. Birrh), in this city, they are about completing a novel piece of mechanism, in the form of a machine for utilizing solar heat. It is being built for the Solar Heat Power Co., of California, and is an experimental machine, with which it is intended to practically test the new principle employed.

The apparatus is intended for the collection or concentration and utilization of the sun's rays for industrial purposes. It consists essentially of a cylindrical heat-receiver of novel construction. The machine is designed so as to heat the water in a steam boiler and generate steam, the sun's rays furnishing the heat.

The receiver is made of sheet metal, with its outer surface lakened, and is mounted on a frame, to which it is fastened at each end. The frame is placed above the foundation of the machine, and is attached to it at one end by means of hinges, and the other end is supported by regulating screws, which are operated simultaneously by gears.

The arrangement is intended to raise or depress the frame so as to give the reflector and receiver the proper latitudinal inclination according to the different solstitial angles in summer and winter.

The reflector is a cylindrical surface of parabolic cross-section, mounted on trunnions fastened to the frame, and is caused to turn and follow the diurnal movement of the sun by means of worm gears. The receiver and reflector are set at right angles with the plane of the sun's course. The rays of the sun striking the surface of the reflector at the proper angle are reflected toward the focus and concentrated on the circumference of the boiler.

The quantity of heat conveyed on the boiler, other things being equal, will be in proportion to the dimensions of the reflector. By using a cylindrical reflector of parabolic cross-section in combination with a boiler of circular cross-section, having the same axis as the reflector, it is possible to concentrate the rays of the sun evenly on the whole length of the boiler, and not in circular spots or rings, as it has been done before, with cone-shaped or parabolic reflectors having surfaces of revolution, with the heat receiver placed vertically, or in other words, in the axis of the surface of revolution.

The apparatus is provided with an orienting device, the object of which is to enable the operator to see that the reflector is at the proper angle with reference to the image of the sun at all hours of the day.

When in operation the reflector is caused to revolve, and is elevated or depressed by suitable devices, and the beams of sunlight are so led that the sun's rays strike the reflectors at the proper angle for concentration on the receiver or boiler. The motions are accomplished automatically by metallic devices which are well known and need not be described here. The heat rays are concentrated on the boiler so that steam is generated, which operates an ordinary engine. Sometimes a glass jacket is carried on the boiler to diminish radiation.

By the arrangement described—a patented device of Geo. W. Deitzler—that is, conducting a reflector having a parabolic or other cross section, and placing the lines of the reflecting surfaces parallel to the axis of the boiler, which is the essence of the whole appliance, it is possible to expose to the sun long and broad surfaces of reflection within reasonable limits and workable conditions, the length and breadth of the reflector being limited only by the convenience of construction, and heat tubes or boilers of great length, the heat rays being concentrated on the surfaces to be heated in long lines, and with great evenness, each section of the boiler exposed receiving the same quantity of heat; whereas the reflectors heretofore used for this purpose being all of the inverted pyramid or cone style, present only small and narrow surfaces of reflection, and gather the ray in spots, a process necessarily quite limited in its practical application. The idea is, by the arrangement described to secure an even distribution of the heat which will act on the surface of boiler much like the flame of the ordinary furnace. The steam generated is utilized in an ordinary engine for any desired purpose. For the southern part of this State, for Arizona, New Mexico, and Mexico, where there is so much hot weather, these engines may be applied to many purposes, such as pumping for irrigating, etc.

Patent Infringements.

In the last two cases tried here for infringement of patent, the inventor has proved his case and made the infringers pay damages. A decision in favor of the plaintiff in the case of John D. Winters vs. Donald Crane and others has been rendered by Judge Sawyer in the United States Circuit Court. The suit was for damages on an infringement of an improvement in wagon derricks, and the Court ordered an interlocutory decree, which was referred to the Master in Chancery of the Court to ascertain and report to the Court whatever damages had been sustained.

In the case of John Reynolds vs. Henry L. Dodge and Alexander Martin, United States Circuit Judge Sawyer recently rendered a judgment to the effect that the letters patent issued to plaintiff March 20, 1866, are good and valid in law; that the defendants have infringed upon said letters by using the same in the United States Branch Mint in this city; that plaintiff recover from defendants the profits which have accrued to the government of the introduction of the invention, and that the matter be referred to S. C. Houghton, Standing Master in Chancery, to ascertain the amount due plaintiff. The invention alluded to consists in boiling crude hulsion in sulphuric acid or nitre, without melting and alloying it with copper and granulating it before refining, as the practice had previously been. The Master reports: "I have, therefore, ascertained and report that since the 20th of March, 1866, 188-, 489.62 ounces of hulsion have been refined by the complainant's said patented process in the United States Mint at San Francisco, Cal., by or under the directions of respondents; that there has thereby arisen and accrued to the government of the United States as advantages equal to the saving in expense by the use of said process in said mint, which is the sum of \$140 upon each 50,000 ounces of hulsion treated at said mint by said process, and that the total saving or advantage which has so arisen and accounted to the government of the United States amounts to \$52,777 05."

The Cœur d'Alene Mines

There is not the least doubt that three quarters of the thousands of men who will be in the Cœur d'Alene mining region within the next two months will be disappointed in their hopes of a fortune. At the same time, this thought, though it may occur to many, will deter few who think of going. Of all classes of people in the world, miners and prospectors are, perhaps, the most hopeful. Each thinks that he, at least, will strike it rich. Repeated failures, expended money, useless work and lost time only stimulate them to renewed endeavors and increased effort. There are thousands of these men who expect to retrieve their fortunes at the new placers; and they will overcome every difficulty to get to the new region. Telling them of the rigors of the climate, the schemes of the traders, the misrepresentations of the transportation companies or the narrow limits of the mining area, will not damp their ardor. They have made up their minds to go, and go they will.

Yet of late many discouraging reports have been received from the new mines. That is to say, men who are there say there has been much misrepresentation about the country, and that reports of the gold finds are highly exaggerated. No work has been done this winter which would prove the assertions of the men who are "hooming" the region. One man writes from the new mines to a Nevada paper that "the camp is the worst humbug that ever saw the light. It is worse than the famous diamond swindle. There isn't enough gold in the cursed diggings to plate a spoon with, and what little there is can only be found under forty feet of snow. Any man who wants to work like a nigger and make about a dollar a day, will find this country just the place." Most of the miners there have been through White Pine, Salmon River, Frazer River, or some other excitement, and they know what a stampede is. Many have confidence in the placers and in the quartz ledges, but they expect to see the usual crowd who rush in expecting to make money easy, go out dead broke and disgusted.

In addressing letters to Belknap, the new boom town on the Northern Pacific, be sure to add Missoula county, as there is a postoffice called Belknap in Choteau county.

Publication of Mining Notices.

It has been decided officially that the selection of newspapers for publication of mining notices is a matter resting in the sound discretion of the United States Registers, within the limits prescribed by section 2325 of the Revised Statutes; but, that other things being equal, the convenience of the applicant should be consulted. The case grew out of a refusal on the part of a certain Register to publish notices of intention to apply for a patent to a mining claim in a certain newspaper.

The grounds of complaint were substantially as follows: Before making application for patent, on behalf of certain clients, for four mining claims, Mr. Arnold obtained terms from the two newspapers published at the mining town in the district. One of them offered to publish notices of the four applications for \$90, and the other for \$48, thus making a difference in cost to the applicants of \$42. Upon filing the applications, he requested the Register to direct publication in the cheaper of the papers, both being published equidistant from the claims. This the Register refused to do, unless the proprietor of the one making the lower bid would enter into bonds with him for the continuance of regular publication of his paper during the sixty days required by law.

The Commissioner of the Land Office called on the Register for an explanation of his refusal to allow the notice to be published in the paper charging the least. He explains his action by stating that he did not at the time and does not now regard the paper referred to as "a reputable newspaper of general circulation." Also, that in cases where he has doubts as to the stability of a newspaper, it has been his custom to require bonds for the continuance of publication, similar to that mentioned above, and that such bonds have been promptly furnished by other papers.

The complaint raises the question, What is the legitimate discretion of the Register in regard to the publication of notices?

Section 2325 Revised Statutes, U. S., provides that the Register shall publish the notice "in a newspaper to be by him designated as published nearest to such claim." This section, according to the construction adopted by the department, vests a discretion in the Register even as to papers published at unequal distances from the claim, and he may exercise his official judgment in designating a paper which is not the one published nearest the claim, under certain circumstances. Where papers are published equidistant, or very nearly so, from the claim, the decision rests entirely with him. The Commissioner of the Land Office says in his letter to the Register: The power of designation in the latter class of cases, to which the one under consideration belongs, being given by the law to the Register, I do not feel authorized to interfere with his decisions. Moreover, he assigns as a reason for his action a fact that would justify him in declining to order publication in the *Journal*, even if that paper were published nearer the claim than any other paper, viz.: that in his opinion it is not "a reputable newspaper of general circulation," as required by the rulings of the Department.

It does not seem to me that the Register has exercised the power conferred upon him in an arbitrary manner. He has offered to publish notices in the *Journal* if its proprietor would assure him, in a manner which does not appear unreasonable, that its publication would not be interrupted. No objection has been made to similar demands in other cases. Without some such assurance, and entertaining doubts as to the stability of a paper, he would violate his duty if he should direct publication to be made therein. His action in the present case seems to be entirely proper. For these reasons I must decline to interfere in the matter. I wish to add, however, that where two or more papers of repute and general circulation are published equidistant, or very nearly so, from a mining claim for which application has been made, the Register should be guided in the exercise of his discretion by a due regard for the convenience of the applicant, all other things being equal.

The Lane mine, in the Bradshaw mountains, Arizona, has been sold to T. J. Eaman, for \$20,000.

Industrial Notes.

The first leather manufactured in Ukiah, Mendocino county, has just been turned out of the new tannery there.

The Standard Soap Company, of Berkeley, intend erecting works to save the glycerine contained in fats, for which there is a large demand in manufacturing nitro-glycerine at the neighboring powder works.

Over 400 men are in steady employment at the Judson Manufacturing Works and the California Iron and Steel Works, at Emery station. About 2,000 Victor mowing machines will be turned out at the former factory this season.

The new oil works of the Arctic Oil Company, at South San Francisco, are rapidly approaching completion. The machinery is nearly all in position, and the corrugated iron roof will soon be on, and it is expected that the entire affair will be in working order by April 15th. In a few months refined oils of home manufacture will be on the market.

Congressman Roscerans has forwarded to the Labor Bureau here an invitation sent out by the Pennsylvania Museum and School of Art to California manufacturers of porcelain, glass and pottery, announcing an exhibition of these articles. Decorations on porcelain are to be especially classed, and it is on account of the numerous workers in that branch of industry that the Labor Bureau calls attention to the circular.

Deane Brothers' Steam Pump Works have recently received orders for their independent air-

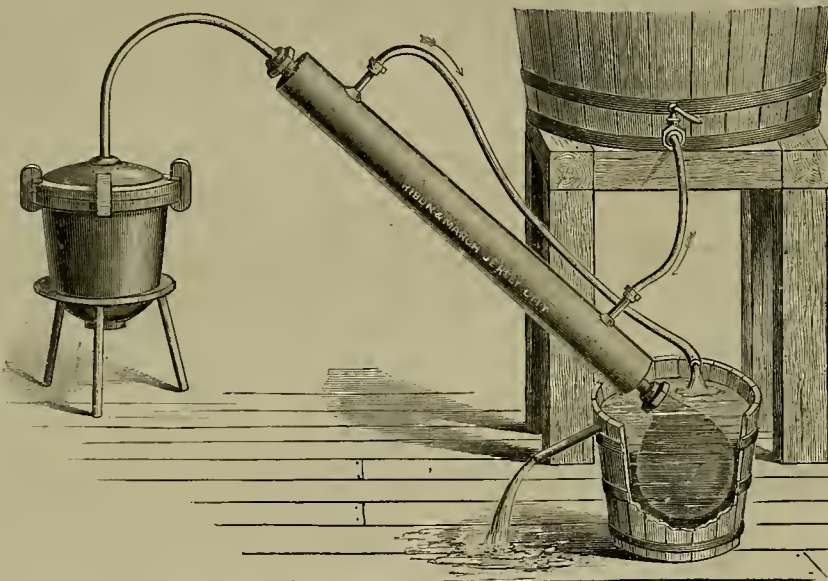
Retort and Condenser.

Last week we illustrated a form of retort for silver amalgam, and on this page we give an engraving of a retort and condenser for gold amalgam. The retort is turned smooth inside, and is of a shape peculiarly adapted for rapid and complete exhalation of the quicksilver. Of course this can be used for silver amalgam if desired.

The condenser attachment, shown in the cut, which is made of either brass or iron, is, as will be observed, of very important use in facilitating the process of retorting by decreasing the time required, and permitting of a more perfect condensation of the quicksilver through its automatic action; adding but little to the cost, and can be applied to any retort pipe, as it is not a fixture, and if made of brass will not rust. The rubber bag attached to the end of the retort pipe prevents all danger of explosion. It should, of course, be immersed in a vessel containing water. The distension of the bag indicates that quicksilver is still being condensed, and its collapse indicates that the operation is complete. The Hendy machine works have these appliances. The tripod or retort stand can be made by any blacksmith.

Gold in Black Sands.

In Mr. Paul's article of last week on this subject he said that the great loss of gold in one hydraulic drift and river working is in that



IMPROVED AMALGAM RETORT AND CONDENSER.

pump and condenser from the Logansport (Ind.) Electric Light Company, Clinton (Iowa) Water Works, Yaeger Mill Company, Kane, Ill., and Brush Electric Light Company, Indianapolis. Deane Bros. are getting out patterns for a new line of duplex pumps.

The cigar-makers' strike is at an end, the locked-out Chinese agreeing to return to their work without any concessions from the bosses. The conditions under which they returned are that they resume work before any agreement is entered into; that they do not ask for any advance under twelve months from date; that the cigar-makers employ any workmen they see fit, regardless of non-membership in the Chinese Union, and finally, on the bosses' part, an advance of fifty cents per thousand on the higher grades of goods was conceded. Still the experiment of the school for teaching white boys and girls to make cigars is to be continued with a view of eventually displacing the Mongolians entirely. The Board of Directors will be required to file a bond in the Internal Revenue Office of \$500 for the school, as it has been decided that it will properly come under the head of a factory. The law also requires that a bond in \$100 shall be filed for each person employed in any factory where cigars are manufactured. As the Directors expect to have 500 boys and girls at work within a short time, a bond of \$50,000 will be required.

The Excelsior Mining Company, of Smartsville, has about 44 miles of ditches, furnishing a minimum supply of 3,000 inches of water. The Golden Gate Company, of the same place, has 28 miles of ditches, and its least supply is 500 inches of water.

Value of Tailings.

If miners are apt to allow themselves to be fooled on the probable average value of ore in a mine, taking as a basis assays of ore of a class which they ought to know to be above the average, they are still more apt to be misled on the subject of the value of tailings. Most mine owners think their tailings are worth more or less money. The mill superintendent is perhaps the only one who does not believe in the value of tailings. He may think those left by his predecessor have a good deal in them, but you cannot easily make him believe that the ore he has worked has not yielded pretty much all its precious contents.

There is no doubt that old piles of tailings from ore worked many years ago, in which the sulphurets have had time to decompose more or less, by exposure will often pay to work. The old-fashioned haphazard way of working ore made rich tailings. There are instances where tailings worked three times over have paid each one who worked them. But it by no means follows that every pile of tailings is worth working.

The writer has in mind an instance where, at a gold mine which had been worked at a profit for many years, there was a pile of several thousand tons of tailings. They had been systematically turned and shoveled over several times in order to facilitate decomposition of the sulphurets. High assays had been obtained, and the pile was always spoken of as a

good mine in itself. By and by, some experienced and practical men were induced to make a long journey to see these tailings, with a view of working them on shares. They went systematically to work to get an average of the pile, spending a couple of weeks in the work. They found that, taking the pile right through, the tailings were worth only about \$5 per ton. In the locality referred to it would have cost more than that to work them. The men who own the pile, however, still think it worth about \$20 per ton. Though as this was some time ago, and they still want to sell, not work, the batch, it is probable the \$5 average was nearer the truth.

Some old slag dumps and many old tailings piles have paid those who have worked them very well, but it is not always proper to estimate a tailings pile very high in the assets of a mining company.

A case, however, where tailings figure high in this connection, is that of the famous Alice mine, at Butte, Montana. In the recent official report, which has occasioned so much comment, there is this paragraph: "There are two large reservoirs of tailings which contain about 70,000 tons, at an estimated average value of \$5 50 per ton, making \$385,000. This does not include the quicksilver and amalgam which has been lost in the process of milling."

This is of course encouraging to stockholders, and is supposed to show they have something for the money they have expended, even if it is in the doubtful shape of "tailings." But the Butte *Inter-Mountain* says of the statement, "It is insulting to common intelligence. There is not a man, woman or child in this camp that does not know that the Alice tailings reservoirs are absolutely worthless. We would be willing to wager that were it not for the sake of appearances and the desire to have some 'assets' on hand, Mr. Walker would take \$10 for the entire 70,000 tons. This '\$385,000' does not include the quicksilver and amalgam which have been lost in the process of milling," says the report. This makes the matter still more ridiculous. But admitting that the value of the quicksilver and amalgam equalled the silver and gold value of the tailings, which is of course not the case, and that the value of the tailings was \$11 per ton; it would still be preposterous to claim that the tailings would pay to work. Seventy thousand tons of limestone would be far more valuable. It is not justifiable to put a value upon that which is valueless."

The annual report of the Omaha Smelting Works Company puts the production of 1883 at \$12,700,000. This is an increase of 33 per cent over the output in the preceding year. The force employed last year averaged 350 men. Over 17,000 tons of coal and 8,000 tons of coke were consumed, and \$750,000 paid to the Union Pacific Railroad for freight charges.

associated with black sand. In the table given, one of the headings, viz: that referring to "drift mines," was accidentally omitted, so we repeat the table corrected as follows:

Tests from Hydraulic Mines.

No. 1, per ton	\$22 20
No. 2, per ton	80 00
No. 3, per ton	347 00
No. 4, per ton	28 75
No. 5, per ton	168 00
No. 6, per ton	12 00
No. 7, per ton	475 00
No. 8, per ton	54 00
No. 9, per ton	221 80
No. 10, per ton	240 00
No. 11, per ton	90 00
No. 12, per ton	140 00
No. 13, per ton	98 00
No. 14, per ton	152 05
Average, per ton	\$152 05

Lowest Tests from Drift Mines.

No. 1, per ton	\$6 00
No. 2, per ton	15 80
No. 3, per ton	65 50
No. 4, per ton	271 80
Average, per ton	\$103 25

Lowest Tests from River Mining.

No. 1, per ton	\$10 00
No. 2, per ton	27 90
No. 3, per ton	15 44
No. 4, per ton	17 78
Average, per ton	\$14 21

Test of Ocean Beach Sands.

No. 1, per ton	\$0 32
No. 2, per ton	2 10
No. 3, per ton	3 50
No. 4, per ton	18 50
No. 5, per ton	18 00
No. 6, per ton	2 30
No. 7, per ton	1 35
No. 8, per ton	80
No. 9, per ton	4 20
No. 10, per ton	1 75
Average, per ton	\$6 82

There was no very close concentration of these sands, is what Mr. Paul wrote—not "concentration of these sands."

The Anaconda mine of Montana ships 25,000 tons of ore a month over the Northern Pacific railroad.

Experiment Stations.

A very important measure to aid practical science is now pending before Congress. On the 10th of December, 1883, the Hon. A. J. Holmes, of Iowa, introduced a bill "to establish National Experiment Stations in connection with the Agricultural College of the various States."

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That in order to enable the Department of Agriculture to fulfill the design and perform the duties for which it was established, as declared in the organic act creating the said department, to-wit: "to acquire and diffuse among the people of the United States useful information on subjects connected with agriculture in the most general sense of that word, and to procure, propagate and distribute among the people new and valuable seeds and plants," institutions shall be established in connection with each of the agricultural colleges in the State providing such colleges, with an improved farm in connection therewith, and placed under the conduct of such colleges, to be called and known as "national experiment stations."

SEC. 2. That it shall be the object and design of the said national experiment stations to conduct original researches or verify reported experiments on the physiology of plants and animals, the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation within the isothermal limits represented by the climate of the several stations and their vicinity; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative values for raising crops of different kinds; the composition and digestibility of the different kinds of food for cattle; the scientific and economic questions in the production of butter and cheese, and all other researches of experiments bearing directly on the agricultural industry of the United States.

SEC. 3. That the said experiment stations shall be placed under the general control of the regents or trustees of said agricultural colleges, who shall have power to employ a professor for each agricultural college who shall act as superintendent of the experiment stations established under this act.

SEC. 4. That the said professors shall make such reports to the Commissioner of Agriculture from time to time as he may direct. The general character of the work and of the experiments to be performed at each station shall be determined by the Commissioner of Agriculture, the president of the college where the station is located, and the professor in charge of said station.

SEC. 5. That to each agricultural college providing for experiment stations under this act, to pay the salaries of the professors and superintendents of the said experiment stations, the wages of the laborers employed in their operations, and the cost of the experiments and researches connected with their conduct as heretofore specified, the sum of fifteen thousand dollars is hereby appropriated out of any money in the treasury not otherwise appropriated, or so much thereof as may be necessary to cover expenditures actually made for said purposes; the money to be drawn quarterly from the treasury of the United States, upon a certified statement of the amounts actually expended at each station, properly indorsed by the college board of audit, the professor in charge, and the Commissioner of Agriculture.

SEC. 6. That upon the passage of this act, before the agricultural college in any State can draw any funds as provided, the Legislature of such State shall pass an act accepting such trust and agreeing to conduct an experiment station in accordance therewith.

This is the movement toward the establishment of experiment stations to which we alluded last week. The measure is a wise one and we trust it will be enacted without fail at the present session of Congress. It will be just what is needed to continue and extend the valuable experimental work which is being done at Berkeley, and in other parts of the State, under the supervision of Professor Hilgard. In fact, the internal evidence in the above bill shows that it took its cue from articles which Professor Hilgard published in the *Atlantic Monthly* nearly two years ago, and it would give him much satisfaction, no doubt, to carry forward in this State this work to which he is so thoroughly committed, and for which he is exceptionally prepared. Some of the California representatives at Washington have already declared themselves in favor of the measure, and we hope the representatives from other States are similarly disposed. It will be a graceful act of the government to do for the agricultural interest.

A BRAVE MINER.—Wm. Clemon, one of the miners who was ordered to give up his money to highwaymen, at Nevada City, Saturday night, saved his coin by a bold dash. He threw his dinner-bucket at the robbers, and ran off. He was fired at two or three times, but the shots did not take effect.—*Grass Valley Union*.

Miners in the Winter.

Hundreds of miners are snow-bound in the mountains of Colorado, says the *Denver Republican*, and must remain so for several months. It is interesting to glance at the condition of these isolated dwellers on the sides and near the summit of the ranges which constitute the backbone of the continent. Their cabins are commodious, warm and comfortable, and are generally situated at or near tunnel workings, which afford them easy and safe access to the scenes of their day and night shifts of toil. These drifts are used as store-houses for provisions of all kinds, and while some are natural ice-houses others are temperate enough for articles that would be injured by freezing.

The experienced, prudent miner locates his claim in the timber, which tempers the furious windstorms and also protects him from the dangers of the dreaded snow-slides. If the situation is above timber line, he chooses a flat spot, above which the mountains are not high enough to hold snow-banks to break away and sweep down upon him, or plants his stout cabin beneath a sheltering ridge of solid rock in place or upon a "hog-back," which is the sharp divide between two gulches, and upon which both the winds and the contour of the ground prevent snow from accumulating. Granting that he has safely secured to him, what are the remaining conditions of his months of imprisonment? The natural tastes and domestic instincts of the individual are the gauges of his preparation for thorough enjoyment or mere toleration of his voluntary exile, and hence the habits and customs, the pleasures and amusements, and the modes of living are as variable as among the same class of individuals wintering in towns and cities.

But, as a rule, the menu is excellent, thanks to the canning of fruits, vegetables and meats, and all kinds of preserves and relishes. Intellectual pabulum can be made as diversified as in lower altitudes, with the one exception of daily newspapers. Those possessing musical tastes and accomplishments provide generously for enlivening the hours between labor and rest. The convivial soul takes good care that the flowing bowl does not become exhausted ere the snow melts from the trails, or that the tobacco plug and punch are ample for himself and all chance visitors. Water is obtained by melting the snow, and supplies of wood are previously prepared.

The miners, from their cosy cabins, are the observers of the terrific battles of the elements, and not infrequently witness nature's most awe-inspiring throes, commonly termed snow-slides. The snowfall amounts to from three to ten feet in depth on the level, and this is banked by the winds in drifts hundreds of feet in height, covering hundreds and thousands of acres in extent, according to the lay of the land, and when they become top-heavy, or the lower supports give way by melting or settling, the whole mass plunges down the steep mountain sides, uprooting, overturning and crumbling all obstacles in its pathway, until its force is spent in the valley below or against the opposite side. It is impossible to conceive the enormity of the power of a huge snow-slide until one follows in its wake down a mountain, where it has cut a huge swath through a heavy forest, hurled from their base gigantic boulders, scooped out the channel of a frozen river, and deposited the entire debris in solid mass far up upon the opposite bank of the canyon.

Miners have become expert in detecting the location and direction of impending slides, and are thus enabled to avoid them. They, however, become reckless or careless in estimating the time of their occurrence, and by passing over the field they expect to see move later on, they are engulfed in its sudden breaking away, and are hurried to a death they might have escaped by the exercise of more patience. The web and Norwegian shoes enable the practical operator to climb the mountains and swiftly descend them to the settlements for mail or any necessities of life which have not been previously supplied. The writer has often been surprised most agreeably at the preparations for comfortable, and even luxurious, living by men thus snow-bound in the mountains in different parts of the State, and in only a few instances has noticed any scarcity or lack of variety in the essentials of either comfort or rational enjoyment.

The Utah Smelter Bill.

H. F. No. 70. Territory of Utah, Twenty-sixth Session. In the House of Representatives, March 3, 1884, the Committee on Public Health introduced the following:

A Bill Regulating the Building and Operating of Smelters in the Territory of Utah.

SECTION 1. Be it enacted by the Governor and Legislative Assembly of the Territory of Utah: That hereafter no person, firm or corporation shall erect and operate any smelting furnaces in or within the quarantine limits of any incorporated city without the permission of the authorities thereof, nor near any agricultural or grazing districts in this Territory, without building or operating in connection with said smelters good and sufficient condensing chambers, with the required amount of superficial surface to prevent the escape of lead and other poisonous substances in such quantities as would prove injurious to the health and property of the inhabitants in the vicinity.

SEC. 2. All persons aggrieved and injured by

the non-compliance with the first section of this Act may, upon proper showing before any competent Court, recover damages to the extent of their losses or injuries, from the agents, operators or owners of such works, and also a writ of injunction restraining such persons from operating until they have complied with the provisions of the first section of this Act.

SEC. 3. All persons violating the provisions of the first section of this Act shall be deemed guilty of a misdemeanor.

Working the Mount Cory Ore.

The ore, after being brought from the mine on ore wagons, a distance of about eight miles, is dumped at the first rock breaker, passing through this pair of monster jaws is conveyed by cars to the tryere, from where, after being mixed with salt it is passed through another rock breaker, and from this is passed through a set of three Cornish rollers, the last one rendering it fine enough for roasting; from the rollers it is carried by an elevator to a chute, and from the chute to the furnaces, where it is roasted. After this process, it is spread on a floor to cool; being sufficiently cooled, it is carried by cars to the vats where it is leached for its silver.

The ore contains silver and some gold, together with copper, lead, antimony, arsenic and zinc. The silver in the ore is by the process of roasting converted into a chloride; part of the copper into chloride and sub-chloride; the lead into sulphate of chloride; the zinc is reduced to oxide and partly to volatile chloride, and the iron remains principally as an oxide and a small part as a chloride—in this condition the ore is put into the leaching vats of which there are twenty-four, holding about ten tons each—while in this condition, the ore is first leached with water to dissolve out all the base chlorides, together with the salt remaining in a soluble state in the ore.

Chloride of silver is insoluble in water, but the solution of salt and base metal chloride have formed will dissolve silver to a considerable extent. To recover the silver from this water Mr. Arents collects the water as it runs from the leaching vats, in large precipitating tanks in which cement copper is placed; this copper will take up the chlorine from the silver and go into solution, and metallic silver will be deposited on the copper. This solution has then given up all the silver to the copper and it is allowed to run off through the water-pipe. After the ore in the leaching vats has been leached with water until everything soluble in water has been extracted, it is then leached with a solution of hyposulphite of soda for its silver. This operation will take from two to three days before all the silver is extracted. The hyposulphite solution as it filters through the ore, flows into precipitating vats, where the silver is precipitated with sulphide of calcium as sulphide of silver and the solution of hyposulphite freed of its silver, is pumped up to a storage tank to be used again as wanted.

The residuum—a kind of black slum—is then ready to be converted into bullion, and as the mine is turning out ore in unlimited quantities, and of number one quality, and the mill working like a charm, we do not see any reason why this should not be a large bullion producing camp, and have a boom in the near future that will put *Cœur d'Alene* or any other camp in the shade.

SUPERFICIES OF THE OCEANS OF THE WORLD.—From a work by Dr. Otto Krummel, of Göttingen, we learn the extent of the different seas on our globe. According to his calculations, the Atlantic ocean has a superficies of 49,429,468 square miles; Indian ocean, 45,462,040 square miles; Pacific ocean, 99,897,917 square miles. Thus the total superficies of the three large oceans is 194,787,425 square miles. The Arctic ocean has a superficies of 9,481,294 square miles. In the Arctic ocean, Hudson's bay has a superficies of 663,249 square miles, and the White sea, 7,715 square miles; the Australian sea, 5,112,491 square miles; Mediterranean sea, 1,789,029 square miles; Baltic, 257,559 square miles; Red sea, 278,944 square miles; Persian gulf, 146,837 square miles. Then come the seas that Dr. Krummel calls coast seas, viz.: North sea, 339,526 square miles; Sea of Great Britain, 126,200 square miles; Sea of St. Laurent, 170,109 square miles; China sea, 761,632 square miles; Japan sea, 647,170 square miles; Sea of Okhotsk, 934,717 square miles; Behring sea, 1,440,338 square miles; Sea of California, 103,678 square miles. The total superficies of these coastal seas is 5,423,460 square miles. Adding the Antarctic ocean, the superficies of which is calculated at 12,606,236 square miles, the total superficies of all the seas is 231,915,905 square miles, while the total superficies of the continents and islands of the globe is only 34,354,950 square miles.—*English Mechanic*.

ARTIFICIAL OYSTERS.—Artificial eggs are beginning to be quite well known in the market in some portions of the country, but now it seems that artificial oysters are the latest things in deception, and numbers of "manufactured bi-valves" are said to be passed off on the Paris public. Hitherto, although the oyster itself could be well imitated, it had been found impossible to make the substance adhere to the shell like nature, but an ingenious personage has invented a glue which overcomes all such difficulty. The exact composition of the imitation is not stated, but copper is a prominent ingredient.

Electricity in Mines and Mills.

The Mount Cory reduction works, at Mount Cory District, Nevada, are now in full operation. About 1,000 tons of ore are on hand, and notwithstanding the icy condition of the roads, the teams are kept constantly at work. Everything, to the most minute detail, is exactly as was contemplated in the beginning. No breaks have occurred; no stoppages have delayed the steady advance toward completion. When the immense size and complicated character of the whole mill is considered, it will seem a matter of wonder that everything could be made to fit and work so perfectly. A feature in the crushing of the ore as described by the *Walker Lake Bulletin*, or the *Esmeralda Herald*—we are not sure which—is the electro-magnet in the ore chute over the rolls. As small pieces of pick-points and chips from the edges of shovels might be run through the rolls, it was thought best to prevent any possibility of resultant damages by placing a powerful magnet in the chute. A six-horse power dynamo machine is connected with the magnet, and gives it power sufficient to draw to it and hold any iron or steel which might otherwise get into the rolls.

According to *Engineering*, Messrs. Siemens and Halske, the well known German electricians, have recently applied the dynamo to the ventilation of the Carola pits, in Saxony. Two dynamos of the Siemens No. D 8 type were employed, one being on the pit head, the other coupled to the ventilating fan underground. The armature of the first dynamo is connected direct to the crank-shaft of the driving motor—a Dolgorki rotary piston steam engine giving an available work of two and one-half horse power, with an effective boiler pressure of three and one-half atmospheres. The conductor carrying the two machines is carried about 2,500 feet, and consists of a copper wire 0.28 inches in diameter, supported on stoneware insulators along the shaft. The return conductor for part of the way is an old steel wire pit rope, 1.18 inches in diameter, and for the other part a conductor of copper similar to the lead conductor. The second dynamo drives the ventilating fan by a strap, the shaft of the former making 124 revolutions to 100 of the latter. The ventilator is a centrifugal fan, made by G. Schiele & Co., about three feet three inches in diameter. The loss of power by the circuit one way and another is about forty-six per cent. The cost of working is 6s. 3d. per day, or about 3d. per million cubic feet of air delivered.

Asphaltum.

Domestic Asphaltum.

Asphaltum is mined to a small extent in California, has been found in West Virginia (gramamite), and recently has been reported in Colorado; but the production in this country has hitherto been very limited. About 3,000 tons of domestic asphaltum are used in California annually. Most of this comes from Santa Barbara county, from deposits near the coast, and this is said to be the best material, as it is the hardest and does not shrink. Some asphaltum is also shipped from San Luis Obispo county, and some from Santa Clara county. It is used for sidewalks and for street pavement, and also for coating water pipes. Some 18 miles of the 26-inch pipe of the Spring Valley Water Company, which supplies San Francisco with water, is coated with this substance. The asphaltum costs \$3 to \$4 per ton at the coast landings where produced, and \$8 to \$10 per ton in San Francisco.

Foreign Asphaltum and Asphalt Rock.

The asphaltum used in the Eastern States is almost exclusively imported, and comes mainly from the pitch lake at La Brea, in the island of Trinidad. The price is about \$14 per ton on the Atlantic seaboard. The use of the Trinidad asphaltum is increasing, some 10,000 gross tons of the crude substance having been used in the city of Washington alone, in paving the streets. In preparing it for paving, the asphaltum is tempered with heavy petroleum and mixed with sand and powdered limestone, thus imitating the natural asphalt rock. Messrs. Louis Monjo & Co., of New York, report an importation of Cuban asphaltum of 650 tons in 1882, the price ranging from 13 cents per pound up. There is a considerable importation of rock asphalt from Switzerland, one prominent locality being the Val de Travers, canton of Neuchâtel. This rock is manufactured into a mastic known as rock asphalt mastic, which is used for laying the wearing surfaces of sidewalks, roofs and floors. With the crude rock asphalt the wearing surfaces of carriageways are prepared. This crude rock asphalt is a carbonate of lime, naturally and evenly impregnated with bitumen. It sells for \$18 per ton of 2,000 pounds; and the manufactured mastic at \$23 per ton. The importations of foreign asphaltum during the fiscal year 1882 amounted to 30,686,333 pounds, invoiced at \$103,152. Crude asphaltum and bitumen are on the free list. The exports of asphaltum during the period mentioned amounted to only 8400.

The extensive Shasta River canal, owned by the Yreka Creek Gold Mining Company, has been purchased by E. B. Edson, who will extend it around the west side of Yreka, as formerly, if the Hawkinsville miners will make him a good proposition to that effect.

ENGINEERING NOTES.

The Advantages of Light Draught for Vessels.

Some years ago, standing on a point in the Bay of Fundy, we saw an Indian paddle a birch canoe up against a fierce rush of the tide, which no six men could have stemmed with an ordinary row boat, but the Indian shot up with ease, because his birch went over the water and scarcely at all through it. The fact was suggestive.

When we speak of light draught we refer to vessels whose breadth of beam shall equal nearly three fourths of their length, with this breadth carried well forward and aft. The power of a heavy sea to strain, twist or crush a ship depends absolutely on the power which that sea exerts upon her by reason of resistance which it meets when it strikes her. The deeper she is buried in the water the more this resistance is increased. The fury of the rushing surface movement is driven violently against her hull, which is held by the relatively less fiercely impelled water of which her deep draught takes hold. This lower stratum, though itself tossed by the storm, is less moved than that above, and it is to just that extent a solid body against which she is forced, and resultantly the less her draught the less there is of resistance and the less of strain.

Another item is the increased stability of the craft consequent on the increased breadth of beam. In passenger-carrying vessels this is a matter of no small moment. But, independently of this, a saving of motion is also a saving of wear and tear upon the vessel's frame; and if she is a sailing craft, increased stability gives in addition increased power of carrying sail with safety, and less liability to suffer from violence of wind or sudden changes.

The question of speed is for future consideration. But all these points, which pertain to the vessel herself, are of very small consequence compared to the advantages to be derived from her shallow draught by reason of the facilities for navigation which will be caused by it. Harbors in almost endless numbers will become available for active commercial service, which are now relegated to dependence on small and poor coasters, and imperfectly served at that. As all the world knows, the characteristic of all our Eastern coast, south of Cape Cod, is shallow water; scarcely a port can be found to which our largest vessels can have free access at all times of the tide, and into by far the greater majority large ships cannot enter at all.

If now we can devise any means by which ships of such size as the exigencies of modern commerce demand can be so constructed as to draw a relatively small amount of water and yet be just as thorough craft as now, as ready to keep the open sea, the world over, a ship of 3,000 tons, for instance, to draw but six or seven feet, we shall have opened a new and wide range for commerce and navigation.

Foreign Engineering Enterprises.

There are several large engineering projects at present on the tapis in Europe. There is plenty of capital, and the bridge between contemplation and realization may be passed over or not, according to the energy of speculators and the trust of investors. From our foreign exchanges we find the following large projects discussed:

A new examination committee has been formed for cutting a canal between the ocean and the Mediterranean.

This project has come up at various times, and would practically do away with the long, and, according to the song, "rough passage," through the Bay of Biscay, would deprive Gibraltar of its importance, and would open up a new route for the Mediterranean. The great objection to this canal, which would run from near Bordeaux to Narbonne, would be the large number of locks required.

The plans for forming the connection between the Scheldt and the Meuse are no fewer than three: 1st, via Hasselt, Quadmechelen and Herenthals; 2d, via Hasselt, Bolderberg, Diest and the Ruppel canal; 3d, along the valleys of the Paer, Herck and Demer. The second scheme is the one, however, favored by the author.

There still remains immense canal work to be done in Europe. The glorious Rhine has actually no sea outlet, and good as the Dutch are at "dams," they have never been able to regulate the Waal, or known what became of the Rhine. The Elbe canal will also be a great work, although it may be retarded by political complications in Prussia. A committee of engineers has been appointed for reporting on the removal of the obstructions of the Iron Gate on the Danube. In fact there is no absolute impediment to Vienna becoming one day a great port.

In England nothing is doing in the way of canal cutting, although the Manchester canal project crops up periodically. While practically possible, it may be doubted whether the extra expense involved in transshipping cotton (and this would be the only freight almost) from Liverpool to Manchester would not be counterbalanced by the lesser tonnage of vessels and by the disturbance of existing commercial relations. It is not the river, but the tide, that saves Liverpool, and the Mersey beyond Runcorn does not amount to much.—*Engineering News.*

USEFUL INFORMATION

The Protective Action of Tin Upon Iron.

This question has considerable scientific interest. It is well known that two dissimilar metals in contact with each other, in the presence of an exciting liquid, will form a galvanic couple, the conditions of the galvanic battery being thus practically established. Under these circumstances, precisely as in the galvanic battery, the electro-positive metal of the combination will be dissolved (corroded, oxidized), while the electro-negative metal will remain unaffected, and, when thus coupled, the solvent or corrosive action of the liquid upon the electro-positive metal will be more energetic and rapid than when it is exposed alone to its action. The energy of the galvanic action set up by two metals thus coupled, will be governed by their relative electro-chemical characters. For instance, between two metals standing near to each other in the electro-chemical series, the galvanic action will be exceedingly feeble; but this will progressively increase as they recede from each other in the electro-chemical series.

Applying these facts to the case of tin and iron, it will appear that they stand, relatively, considerably apart, and their union under the proper conditions will provide the elements for a galvanic current of some intensity. In such a combination tin is the electro-negative element, and is therefore protected, and iron is the electro-positive element, and is therefore the metal which is chemically acted upon by the electrolyte or fluid excitant.

When exposed to atmospheric moisture, which will play the role of an electrolyte, tin-coated iron must be perfectly coated with tin in order that it shall not suffer rapid deterioration. These facts are fully known, and the manufacturers spare no care and attention to coat their iron so perfectly that it shall be without a flaw. Wherever such a flaw exists, or wherever moisture can find its way between the two metals, galvanic action is at once set up, and the points in question become the foci from which the oxidation of the iron extends in all directions, like the continually widening circles made by a stone cast into a pool of water.

So long, however, as the tin coating remains intact, the tin, by reason of its presence and its indifference to atmospheric influences, effectually protects the underlying iron; but it should not be forgotten that as soon as the continuity of the tin coating is destroyed, the rusting of the iron, when exposed to moisture, proceeds with greater activity than if it were uncovered. Where, however, the tin coating has been removed for a considerable space by the oxidation of the underlying iron, the exposed surfaces of the latter metal behave to all intents and purposes as though the tin were absent, since it is only at the points of contact of the two metals that the galvanic action is maintained.

The above remarks will serve to explain why tin-coated vessels, or sheets, exposed to the damp or allowed to remain wet for a comparatively short time, are rapidly eaten through by the rusting of the iron; and also why it is important to completely dry such vessels at once after using them, or to protect with a coating of paint or varnish tin-coated sheets—tin-coated roofs, for example—that are to be exposed to the weather.—*Manufacturer and Builder.*

WHY COCHINEAL AND CARMINE ARE SO COSTLY.—The London *Ironmonger* explains why the beautiful cochineal and carmine colors are so expensive. It says: "One of the best and most powerful animal dyes used in the arts and manufactures is the body of the female cochineal insect, dried. This insect exists on a species of cactus, and when alive is about the size of a lady-bug, or perhaps a trifle smaller. It is wingless, rather long, equally broad all over, and is marked behind with deep incisions and wrinkles. It has six feet, which, curiously enough, are only of use directly after birth, and secrete itself to the plant by means of a trunk, which is found between the forefeet, and derives its nourishment from the sap. The male cochineal is like the female only during the larval period. It changes into chrysalis, and eventually appears as a red fly. The female deposits some thousands of eggs, which she protects under her body until they are hatched, and on the appearance of the young ones the parent dies. When the young are in the larva state their sex cannot be determined. They lose their skin several times, and while the female fixes herself on the plant, the male, after getting over the pupa state, is winged. Two or three months is the extent of the life of these little insects. They are gathered before they lay eggs, and are then rich in coloring matter. Carmine is prepared from the cochineal insect—*Coccus cacti*—which is collected by brushing the branches of the cactus with the tail of a squirrel or other animal. This is very tedious work. They are killed by being immersed in boiling water.

OBSCURING GLASS.—There are many ways of accomplishing this, some of the plans making the glass permanently frosted, others temporarily so. For permanence, take a flat piece of marble, dip it into glass-cutters' sharp sand,

moistened with water; rub over the glass, dipping frequently in sand and water. If the frosting is required very fine, finish off with emery and water. As a temporary frosting for windows, mix together a strong, hot solution of Epsom salts and a clear solution of gum arabic; apply warm. Or use a strong solution of sulphate of soda, warm, and when cool wash with gum water. Or dab the glass with a lump of glaziers' putty, carefully and uniformly, until the surface is equally covered. This is an excellent imitation of ground glass, and is not disturbed by rain or damp.

A NEW CEMENT.—Ordinary hydraulic cement is said to be greatly excelled in value as a mortar and in power of resistance to the action of water by a French mineral composition which has been brought forward, and for which are also claimed the advantages of being unaffected by air or acids, and of acquiring a stony hardness of 230, retaining this even in boiling water. This article is prepared by subjecting a mixture of 19 pounds of sulphur and 42 pounds of pulverized stoneware and glass to a gentle heat sufficient to melt the sulphur, and stirring it until a perfectly homogeneous mass is formed, when it is run into vessels and allowed to cool. The material thus produced melts at about 218°, and can, like asphaltum, be repeatedly used by heating it gently.—*Manufacturers' Gazette.*

AN ARTIFICIAL LEATHER. says the *Engineering*, mixed with five to ten per cent of sinew and pressed into sheets like ordinary leather cardboard, has been recently made in Germany. Both materials are made separately. The leather pieces are washed, cut, boiled in alkaline lye, torn, neutralized with hydrochloric acid, and finally carefully washed once more to remove all traces of acid. The sinews are treated similarly, but steamed in an acid bath until they are like glue. When thus prepared the materials are mixed, pressed into sheets, moistened on both sides with a concentrated solution of alum, and the upper surface is at last given a thin coat of caoutchouc in solution with carbon bisulphide.

PRICES OF HORNS FOR CUTLERY.—Reindeer horns are brought from Lapland and Siberia to England for use by cutlers in large quantities. The largest stag horns come from the East Indies and China. Many specimens of the antlers are so noble and beautiful that it causes a pang to see them given to the saw of the enter, the more so because they are becoming annually more scarce. The best are now selling for \$600 per ton. Time was when they could be bought for \$50 to \$100.

GOOD HEALTH.

The Spinal Cord.

Professor J. O. Hirschfelder delivered the fifth in the regular course of the Lane Popular Lectures at the Cooper Medical College, the subject of the lecture being "The Spinal Cord."

In considering the nervous system and its importance as the organ of mind, the doctor compared it to a telegraphic apparatus, the two systems independent, but united, the sympathetic or vegetative controlling the functions of life, and the cerebro-spinal or animal controlling sensation and volition. Pursuing the electrical analogy, the nerve cells are like the jar of the battery and the fibres like the wires, but he cautioned against confounding the nature of nerve force with that of electricity. An irritated nerve sends the effects of its irritation quite to the end of the nerve, as for example, a blow on the large nerve near the surface of the elbow will make the finger tips tingle, and when the nose is cut off and the surgeon's art makes another nose out of the skin of the forehead, a touch upon the new nose will for a long time seem like a touch upon the forehead to the patient until the brain has become accustomed to the new conditions. The

Composition of the Nerve Cell

Dr. Hirschfelder explained to be a coating of protoplasm inclosing a nucleus which in turn incloses a nucleolus. The protoplasm sends out arms that branch and re-branch and interlace, forming an intricate network, but also sends out one unbranched arm called the axis cylinder, which as it proceeds becomes inclosed in a coating called myelone, and re-inclosed in a sort of cement which gathers many nerves into one bundle. The nerve celled structure the doctor illustrated with a chart representing a multipolar nerve cell many times magnified. He illustrated the effects of nerve irritation upon the leg of frog with the nerve exposed in connection with the muscles of the leg. Pinching the nerve, touching it with electricity from the battery and with a wire heated in the flame of an alcohol lamp, produced the same effect of a spirited contraction of the muscles of the leg and foot, an effect known to science as isomeric transformation. The doctor described the spinal cord as a mass of nerve tissue, white and gray matter extending from the brain to the small of the back. It was fifteen inches long, as thick as a finger, and protected by scrum, called the cerebro-spinal fluid. A cross section, illustrated on the magnified chart, showed the central gray matter of the cord to be arranged like a somewhat irregular letter H. The white substance of the cord contains no cells, but

fibres that conduct nerves to different parts of the body. The course of the

Nerve Force

Through the vertebrae to the brain, and again from the brain to the muscle to be invigorated, both in the case of the sensory and motor nerves, was most clearly and interestingly shown on the chart. The super-sensitiveness of the finger-tips is due to the presence of corpuscles, the five-hundredth part of an inch broad and the one hundred and fiftieth part of an inch long, round which the nerves are spirally wound, thus giving more nerve surface to irritation. The union between the nerves of feeling and of motion is not far distant, so near as to cause the jerking away of the hand even before the brain has taken cognizance of the pin-prick or scorching about to injure it. This is called reflex action, briefly defined as the contraction of the appropriate muscle when a nerve of feeling is irritated, the contraction taking place without the command of the will. Again the frog, which the doctor called the long-suffering victim of science, because of the endurance of his tissues, was brought to the fore to illustrate the mechanical workings of the muscles after connection between the spinal cord and the brain has ceased. "If you stroke a normal frog," said the doctor, "sometimes he will croak and sometimes he won't, for the will cannot inhibit reflex action. I have severed the connection between this frog's brain and spinal cord and he will croak every time I stroke him." So saying, he took a fine frog from a retort, properly caressed him, and the audience applauded the resulting song. Skelton men in shows, the doctor said, were victims of disease in the cells of the gray matter of the spinal cord, which cause their flesh and muscles to waste away. The lecture closed by a comparison of the brain working on by force of will, though the nerve centres sent in protests of uneasiness, to a monarch ruling by oppression a groaning people. The riot and rebellion which inevitably follow dethrone the monarch himself as well as wreck the kingdom.

THE USE OF LEMONS.—The lemon tree is a native of Asia, although it is cultivated in Italy, Portugal and in the south of France.

In Europe, however, it seldom exceeds the dimensions of the smallest tree, while in its native state it grows to over 60 feet in height. Every part of this tree is valuable in medicine, though we rarely employ any but its fruit—that is, the lemon itself. And every one knows how to employ this in lemonade—to squeeze the juice into cold water; this is the shortest way—or to cut in slices and then boil it. Either way is good. Lemonade is one of the best and safest drinks for any person, whether in health or not. It is suitable to all stomach diseases, is excellent in sickness—in cases of jaundice, gravel and liver complaints. The pippins crushed may also be mixed with water and sugar, and be used as a drink. Lemon juice is the best scorbutic remedy known. It not only cures this disease, but prevents it. Sailors make a daily use of it for that purpose. I advise every one to rub their gums daily with lemon juice to keep them in health. The hands and nails are also kept clean, white, soft and supple by the daily use of lemon instead of soap. It also prevents chilblains. Lemon is used in intermittent fevers, mixed with strong, hot black coffee without sugar. In fact, its uses are manifold, and the more we employ it, externally and internally, the better we shall find ourselves. Natural remedies are the best and nature is our best doctor, if we would only listen to it. Decidedly rub your hands, head and gums with lemon, and drink lemonade in preference to all other liquids.—*The Shakers' Manifesto.*

WHY THEIR TOES WEAR OFF.—A man who has a "canting-toe-to-the-right-and-left sort of walk," during the contact of the foot with the ground, gives it a twist or grinding motion, the obvious result of which would be to wear off his boots rapidly at the parts where the most pressure is exerted. We have seen people who, in walking, give the body a quick, nervous thrust forward just about the time the foot is raised, while the toe rests upon the ground. This peculiarity tends to wear off the leather at the toe rapidly. Many people strike the point of the heel first in walking, and soon run it down through the hard leather lifts.

HOW TO RETARD OLD AGE.—"To sum up shortly what has already been advanced, according to the teachings of modern science the most rational and certain means of retarding old age are by avoiding all foods rich in the earth salts, and by taking daily two or three tumblerfuls of distilled water with about ten to fifteen drops of diluted phosphoric acid in each glassful. Thus are the mineral salts held in solution, and their excretions daily effected. The means herein advocated have also another great advantage—viz: That they cannot possibly do any harm.

TO SLEEP IN CLOTHES worn through the day is a bad practice. The clothes are filled with the effluvia emanating from the natural wastes from the body all through the day. Especially is this the case with those who labor hard, or perspire easily. The poisons of the system thus ejected or thrown off by people in vigorous health furnish a strong reason, if there were no other, for removing or retiring every article worn through the day.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SOUTH SPRING HILL.—Amador Ledger, March 15: The second cleanup of the Talisman mill, running on ore from this mine, was made early this week. For 20 days, run, with ten stamps, on the general run of rock as taken from the mine, without any picking, the yield was 25 pounds of bullion, worth \$6,400. About 300 tons of ore was crushed, so that the average yield was a trifle over \$21 per ton, without sulphurets. This second demonstration of the value of this mine will doubtless spur the owners to put the property in good trim for future working. The mine is being well handled under the able superintendency of John R. Tregloan. Francis Ivers, of Boston, one of the leading stockholders in the South Spring Hill mine is visiting Amador county. He has been sent out by the stockowners to make a personal inspection of the mine, and see what has been done, what is in sight, and ascertain what is needed for the proper development of the property. We understand he is well satisfied with the prospects of the mine, and that the reports which have been made concerning its value are within the truth. It is probable that heavier hoisting machinery will be secured before long, which is greatly needed. The addition of ten stamps to the mill is also a work that will be needed at no distant day. It is a well established fact that ten stamps involve almost as much cost in running expenses as twenty stamps. At any rate, the difference in the cost is altogether out of proportion to the difference in the amount of ore crushed. So that wherever the size of the ore body is sufficient to keep 20 stamps going, it is the path of wisdom and economy to secure a mill of that capacity as soon as possible.

MISCELLANEOUS.—The Bunker Hill is running the 40-stamp mill to its full capacity. A cleanup was made a few days ago, which turned out splendidly. The sinking operations at the Keystone have attained a depth of 1220 ft on the incline. It is the intention to go about 100 ft deeper, and then to open up a level. A bunch of ore was encountered between the granite walls in sinking, of good quality. It was not followed. Since the heavy rains the pumps have been kept busy to control the water, between 200,000 and 300,000 gallons being pumped out daily. The water comes from the surface. Only twice in the history of the mine under its present management has the flow of water been so great as during the past week. Repairing the south shaft of the Governor is progressing. The big tunnel at Middle Bar is now in 700 ft, in soft rock, and progressing satisfactorily. There is a strong body of water flowing through the tunnel. The upper tunnel lacks only 20 ft of being underneath the shaft. It will take from a month to six weeks to make a connection.

SUTTER CREEK.—Cor. Amador Ledger, March 15: James Morgan has been in town the last few days arranging the Mahoney and Wildman mines for operation. The Lincoln is crosscutting on the 200-foot level for the lost ledge, and in all probability will encounter the same at no distant day. The little pick is once more in requisition in the Iowa, and the sound of the stamps will soon brighten up the intellects of the interested.

PLYMOUTH.—Cor. Amador Ledger, March 15: A new ore chute has been struck in the No. 3 north tunnel of the Pacific mine, nearly 100 ft inside of the Empire lines. It is 6 ft wide and opening out. It is good milling rock. This new chute of ore will increase the value of the Empire stock. A prospect tunnel, I am told, is being run south at No. 2 station. A crosscut has been run over 130 ft west to a foot-wall, and now the company intend to run south along this wall in hopes of finding an ore chute on this side of the shaft. If a new ore body is found of paying quality, there will be a big boom in mining matters here, as there are some adjacent mines which there would not be much trouble in disposing of to mining speculators. The present ore body that has produced so much bullion is enough to last five years or more without exploring or sinking for more. The Pacific is 1,400 ft deep, and rock still going down.

VOLCANO.—Cor. Amador Dispatch, March 15: Since I wrote to you last the business of this place has been on the mend. Owing to the last rains most all the gravel mines have started up, but the Tunnel Co. has been considerably damaged. Last Sunday morning their large flume that carries the south branch water to the creek across the tunnel broke down and caused the claim to fill with water and tailings so that they will have to build a new flume before they can commence operations again. It also carried away the water wheel and one side of Gillick's mill so that he is unable to crush any rock for the present. The Downs mine is getting out plenty of rich rock. The mill is running day and night to its utmost capacity. The Tellurium has started up under the management of Mr. Marrassia, formerly of the Gwin mine.

Calaveras.

NEW MILL.—Mountain Echo, March 15: The North End mine, situated about one mile west of this town, is now being worked by the company who recently purchased it. A new mill is in course of construction, consisting of two arastras, two stamps for dry crushing, and shaking tables for saving sulphurets. There is little doubt as to the mine paying, as the ore has been thoroughly tested, and proved to be rich.

VALLECITO MINES.—Monday last I had occasion to visit the Tyler mine, situated on Balaklava, about two miles east of town. I found the owners making preparations to wash an immense body of fine looking gravel which they recently extracted from the mine, and from which they expect to realize quite a handsome amount of the precious metal, as the gravel, on an average, has prospected exceedingly well. It is reported that Keiser & Co. have recently struck rich gravel in their mine. The owners have been engaged in running an incline, and at last, after running nearly 300 ft into the mountain, have struck gravel that will, most undoubtedly, prove this to be a good paying mine. Work on the Winchester mine has not yet been resumed as expected, probably owing to the illness of the Supt., Mr. E. Parsons. Mr. Robert Greenwell, of this place, has two men busily engaged in sinking a shaft on the Bunker Hill

mine. This mine has never been fully developed, and will, perhaps, prove to be a valuable placer mine. There are many quartz claims near here, but none developed sufficiently to give any idea of their value. The New Constitution mine, owned by Sloan & Co. is at present, idle. Work on this mine was suspended last winter, and it is not known when the company will resume work. As water has been abundant for the last week, several miners have been sluicing off the surface claims of Red Hill. I am informed the wash-ups were not satisfactory to the owners.

Inyo.

CARSON MINE.—Inyo Independent, March 14: This mine, situated about a quarter of a mile from the old Chrysopolis mill, we understand gives promise of developing into a fine property. The owners, Messrs. Conklin, Lasky, Anton and Bolinger, already have a shaft down 60 ft on the ledge. At the bottom of the shaft the ledge is five ft wide, and the ore is high grade. Work will soon be started on a tunnel to tap the ledge beneath the shaft, and then they intend to upraise on the ledge and make a connection with the shaft. It is estimated the length of the tunnel will be 200 ft. When completed the ore car can be loaded at the face of the tunnel, run into the mill and dumped into the hoppers without the least trouble, and thus save the expense of handling.

THE STORM.—The late storm has interfered with the mining interests of many districts in this county very materially. At Cerro Gordo the storm was so severe that work on the mines had to be suspended. The blacksmith shop at the Ygnacio mine was blown down and much damage done to other property. The snow on the summit prevents ingress or egress to Deep springs, Cottonwood creek, Beveridge and other districts, thereby stopping a great many mines from working, as no supplies can be got to the mines.

ACTIVE OPERATIONS.—John S. Gorman left here Thursday for Darwin, to meet Hon. P. Reddy, owner of the Defiance mine, and look at the recent rich strike made. We have it on what we consider good authority that active operations will be the result of their investigation, and if such be the fact, we look for large bullion shipments to follow.

SCHOOL CLOSED.—The Lone Pine school—Mr. and Mrs. Clark, teachers—closed for the term yesterday, with appropriate exercises. Supt. of Schools Charles H. Groves was present. Mr. and Mrs. Clark will shortly leave for Hawthorne, Nevada, to take charge of the public school at that place.

THE MAXIM COMPANY'S MINE.—This company's mine is now turning out ore equal to the average of the best mines in the State. The Supt. leaves this week to procure a stamp battery, everything else being in place.

FAVORABLE RETURNS.—Returns have been received from the February shipment of ore from the Brown Monster mine. They are very satisfactory—in fact, better than any previous shipment.

BEVERIDGE DISTRICT.—John Anton and M. C. Lasky, just in from Beveridge, give us the following information from that rich mining district: There are about forty men at work taking out ore in different parts of the district, and the late run of the Lasky mill shows that they are making good wages. The mill crushes lots of fifteen tons or over at \$10 per ton; anything less at \$12. This shuts out the arastras from working custom ores. McEvoy's mill is closed down for the present. The prospectors and mine owners are happy and content, for they can go to work on their claims any time and take out a grub stake, and in some instances make quite a pile of money in a short time. The snow on the summit is about four ft deep, making it difficult to get in or out just now.

Mono.

A GOOD TIME COMING.—Bodie Free Press, March 12: A practical man—not an "expert," but a miner—remarked yesterday that the coming summer would be one of the liveliest that Bodie has ever seen. He is firm in the belief that before the year is ended there will be continuous work from High Peak to Queen Bee Hill, and that there will be more comprehensive prospecting done than ever before. "There is," he said, "an endless amount of low-grade ore here that we know of. If this were economically worked there would at least be profit enough to pay the expense of prospecting for better ore. In other places they work, at a profit, poorer ore than we have. We have proved that we can do pretty close milling here, and when we get to working this low grade stuff on a large scale we will have a big camp."

BODIE.—Free Press, March 16: The week was ushered in by the most severe storms of the season, or for several seasons. A fall of over two ft of snow or nearly as much more, with which the ground was already covered, interfered materially with communication and transportation, and the Bodie mill lost two or three days' time in consequence. The weeks' bullion shipment will therefore be lessened in that proportion. The results of the works of exploration and development in the Bodie have been of a most satisfactory character. The stops at the 306 level are now over 100 ft in length in rich ore, while in the Vulcan vein on the 206 level a bonanza is being opened which is likely to rival if it does not exceed in value the old Bruce and Burgess bonanzas of 1878. In the upraise from the 433 level on the Fortuna ledge the vein is well defined, and some rich ore has been encountered, giving promise of a valuable development between that and the 306 level. Ore is also being extracted from the 550 and 770 levels. This latter is hoisted through the Lent shaft, where the ore bins are filled with rock awaiting shipment to the mills.

Nevada.

GOOD RESULTS FROM THE BANNER.—Foothill Tidings, March 15: Flattering reports were received last evening from the North Banner mine, and created quite a little ripple of enthusiasm among the stockholders in the prospect. The ledge in the main drift and the upper tunnel has improved greatly in the last two weeks, and the ore in the stopes is very good. J. M. Lakenan is now engaged in making five additional stamps for the North Banner, and they will be placed in the mill as soon as they are finished. The mill has five stamps in it at present, and they are kept running from seven o'clock in the morning until seven in the afternoon. A cleanup of the plates in front of the battery, for 48 hours run,

gave 48 ounces as a result, which is very good considering that the amalgamation is done in the battery. On Monday next Mr. Wm. A. Hawley, assistant amalgamator of the Idaho mine, will take the position of Supt. of the North Banner and Jonathan Rosevere will act as underground foreman. Both gentlemen are well qualified for the positions. The outlook for the North Banner is very encouraging. The Merrifield mine, located near Nevada City, was closed down to-day. It was but a short time since this mine was closed, and the shaft allowed to fill with water. While it was in that condition, some parties in New York purchased one-half of the mine and work was soon resumed, but only with a small force of men. The water has not been entirely pumped out since the close, and work was only done in a few of the levels. To-day the mine was closed for the second time, but it is quite likely that tributers will be put on as soon as they can be engaged. Messrs. Bourn and Stoddard, who have charge of the affairs at the North Star, are in San Francisco, but are expected here in a few days. The Imperial Company have commenced sinking their sump, and in a few days drifting will begin. About \$300 worth of pure gold was brought to town to-day by parties who mined it from the croppings of the Hartery mine. The Idaho Company are now running on the 15-level and have a large ledge.

BEAUTIFUL SPECIMENS.—Grass Valley Union, March 15: Yesterday, in the 300 level of the Magenta mine, the workmen encountered some of the richest rock ever taken out in this vicinity. The specimens are dark crystallized quartz, filled with beautiful bright wreath gold. As cabinet specimens they are as fine as ever were found. To-day they will commence taking up ledge in this same level of the mine, and no doubt it will prove very rich. The stockholders of the Magenta have every reason to be jubilant over the flattering prospects of the mine, and those who were lucky enough to purchase stock at 50 cents per share have reason to congratulate themselves upon their good fortune, as the Magenta is certain to soon be one of the leading mines in Grass Valley district.

Plumas.

LORING AND LEAVITT.—Greenville Bulletin, March 12: The cause of the drowning out of the Loring and Leavitt mine does not seem to be clearly understood. Several years ago a drain tunnel was run through the ground at a depth of thirty ft from the surface. This was to catch the surface water and carry it past the ground being worked. The timbers in this tunnel had rotted a good deal, and finally gave way and let the ground cave in. The shaft through which the ground is now worked is about thirty ft east from the tunnel, and is connected with it by an opening. When the tunnel caved in the water backed up, passed through the opening and poured down the shaft, which is 116 ft deep. It is not expected that much more mining will be done on the claim till a new shaft shall be sunk lower down the canyon. This had become necessary, as the ground above the shaft is already worked.

San Bernardino.

GOMBLER.—Calico-Print: There are now 13 men at work on this mine and considerable ore is taken out that will average \$75 or \$100 per ton. Occasionally small, rich pockets of ore are struck that would mill up in the thousands if taken separately. Operations of sinking below the present depth has been suspended for the present and work has been confined to simply taking out ore wherever it can be found in openings already made and in new places recently opened. Teams are supplied daily with ore from the company's mill a Hawley's and there are also 100 tons and over in the ore bin. The Eclipse mine, adjoining the Kearsage on the south, owned by Col. E. S. Basdel and others, recently milled two lots of ore at the Oriental mill that returned about \$500 each. A shaft has been sunk to a depth of about 30 ft and the appearance of the rock has not deteriorated in the least since they first struck ore, which was of a fair grade. Last week Nichols & Co., commenced work on the Tiger mine a short distance above the Garfield.

THE BONANZA KING MINE.—Calico-Print, March 15: Mr. Thos. Ewing, superintendent of the Bonanza King mine, of Providence, called at this office last week while on his way to San Francisco. From him we learned that the Bonanza King is looking splendidly and that recently some very rich developments have been made in some unexpected places in the mine. The lowest working is at a depth of 547 ft and the appearance of the ore at that depth is improving. A 12-foot vein of considerable richness has been discovered in the fourth level back of what was considered the foot wall of the ore zone. There is ore enough in sight, that will average \$100 to the ton, to keep the mine and mill in operation for the next four or five years. The recent hauling of ore to the mill difficult and disagreeable. The mill has been running regularly with the exception of a loss of three days last month in making a few repairs. The other new strikes recently made are still holding out well, and the general prospects of the camp are improving.

SPECIMENS OF ORE.—We have received from Mr. O. G. Leach, superintendent of the copper mines in Ord district, several fine specimens from those mines. A large ledge runs through several groups of mines in this district which at a depth of about 50 ft measures in some places ten or twelve ft in width. The ore averages about 35 per cent in copper, and there are apparently large bodies of this character of ore. Some rich pockets of ore will go as high as 75 per cent. There has been considerable work done on some of the mines, but at present but little is being accomplished.

BULLION FROM IBEX.—Last Wednesday Mr. M. Carey arrived from the Ibex mine with seven bars of silver bullion valued at \$12,840. One of the bars was a heavy one valued at \$2,300. On account of the ore becoming wet by the rains, it became necessary to close down the mill for a few days until it dried out, as the mill is a dry crusher.

LAVA BEDS.—Mr. J. W. Smith arrived in town from the Lava Beds on the 12 inst. He reports having purchased recently the Columbus mine of Messrs. Thos. Gray & Co. The Columbus is the first southeastern extension of the De Soto mine, and has a width of about forty ft in the croppings. The firm, J. W. Smith & Co., are now actively at work preparing to develop the mine, and as soon as a windlass arrives will put on a night and day force of

men. Mr. Smith speaks highly of the camp and says the mines show every indication of permanence. The De Soto is looking well and the workings have been carried to the depth of about 35 ft. Some six or eight tons of first-class ore is already on the dump and many more of second-class. The first-class ore is rated at about \$300 per ton in silver value. Mr. Smith is a miner lately arrived from Nevada, and as his experience in silver ores extends over a term of 20 years or more what he says in regard to the outlook and prospects of the camp can be relied upon. Without any ostentation he pronounces it a good camp, and one which will doubtless last for years.

Shasta.

GOLD.—Shasta Courier, March 15: The "wet weather" creek which runs through town and empties into Middle creek, has yielded considerable gold in times past, and on Main street, since the recent rains, about \$6 worth of gold was picked up. In the garden of F. Prehn, formerly the Harrell garden, placer diggings have been struck and considerable gold lately taken out. In the range of hills northeast from town, and extending from the head of Back street to Bunker Hill on Middle creek, gold is found, but no water is to be had to extract it as yet. Bunker Hill yielded "mule loads" of "oro" and in the hills a little east of that Gold Hill and Daniel's Hill panned out thousands. There are undiscovered bonanzas in this vicinity yet.

QUARTZ.—During the past year extraordinary activity has been shown in discovering, prospecting, locating and working quartz lodes in this county, and the result is that those representing quartz interests are full of courage and go ahead. The year 1884 will undoubtedly witness more activity in this class of mining than any two preceding years has done. The invention known as the Dyer Cannon Ball mill has greatly contributed to, and encouraged mining interests in the county, as they are not costly and do satisfactory work. Among the purchasers of these mills in the county are Thomas Greene, C. J. Kempton, St. Auburn & McKaig, Wm. Hall, Daniel O'Neal, Willard & Wiel, Wm. S. Coleman, Andy Cusick and several others.

Sierra.

PUSHING WORK.—Tribune, March 15: At the Sunnyside gravel claim, located near Poker Flat, the contractors will complete the 100 ft of main tunnel in a week or so. The Company expect to reach gravel in about 100 ft further and when the present contract is completed will immediately let another for that distance. The good work of developing our great mineral resources goes steadily on.

RED OAK.—Mountain Messenger, March 15: Johnny Mason was down from the Red Oak claim this week. He has struck a streak of very hard rock which costs about \$40 a foot to penetrate. The snow is about 20 ft deep at the mine and hard as a rock and full of water. Kendall & Co. have their cut up to the bank, and have struck an old tunnel run something near 20 years ago, but which being too high was abandoned. It shows that there is a back channel in the bank, and it is for that they are running.

LOCATED.—The quartz mine, formerly known as the Graphic, located about one and a half miles northeast of Plum Valley, has been located by Richard Dillon, David Davis, Thos. W. Jones, Gustave A. Deiter and J. M. Davis.

NEARLY READY.—Work was commenced to put on the belting at the new quartz mill of the Sierra Buttes Co., last Wednesday. The stamps to the number of 20 are in place, and Chief Amalgamator, J. Carney, is preparing the copper plates. There was some more work to do on the tramway, and the chances were favorable for crushing to begin some time next week.

COLOMBO.—The Colombo Quartz Mining Co., Sierra City, paid off their men Wednesday. Everything at the mine looks well for the future. The concentrators have been temporarily stopped as there are not enough sulphurets to run them. The Ruby Company is now employing about 60 men, and as there is plenty of water, there will doubtless be good returns before long. There was a cave in the air shaft at the Blue Gravel mine recently at Sierra City. The Bunker Hill boys are at work again after having lain idle since Christmas for want of air. A number of gravel mining locations have been recently made in the neighborhood of Tennessee ravine. A company of Portuguese are ground-slucing for quartz opposite Sierra City.

Tuolumne.

A FLOOD AT THE PATTERSON MINE.—Union Democrat, March 15: The Patterson mill and mine at Tuttletown suffered severely from the flood last week. The water poured in torrents off the hillside into the gulch where the tunnel is located, flooding the mine, tunnel, car track, blacksmithshop and office. A great portion of the dump was washed up against the mill, and much of it swept inside. The water flowed all through the mill, covering the floor with mud and slime. It became necessary to shut down the mill to clean it out, and repair damages. Everything has since been placed in working condition, and the mill has again resumed crushing.

THE MINING OUTLOOK.—Tuolumne Independent: There will be no lack of water for mining and milling purposes in this section; therefore, a renewed activity in quartz and other branches of mining throughout the county is looked for. Reduction works are now being placed on the Stockton mine, and the Oakland Company contemplate erecting a twenty-stamp mill on the Auburn mine at no distant day, and many new mines in this district are showing flattering prospects as the process of development progresses. Once the great mineral and other natural resources of the county are fairly developed and opened out to the commerce of the State, through ample railroad facilities, Tuolumne will be classed among the wealthiest counties in the State. Progress, in reaching this stage of commercial importance, will be slow and tedious; yet, the county has within its boundaries undeveloped wealth, which, in after years, will justify its title to such a place in the future history of the State.—R. O. Columbia, March 13, 1884. At the Patterson mine they are sinking the main shaft rapidly, working three men to the shift. The rock looks well, showing gold daily. The vein is very large, no hanging wall showing—which necessitates close timbering. The Patterson, generally, never looked so well before, or with a better prospect. The flood at Tuttletown did some damage at the Patterson mine, delaying operations some two days. The rush of debris down the gulch backed up at the tunnel, and came within an inch of going

into the shaft. Had it occurred in the night, it would have occasioned a loss of life in the mine. The dump was washed into the mill, and a bad mess made generally. The energetic Supt. has everything again in running order.

BEN SOULSBY MINE.—The Ben Soulsby mine, under Col. J. L. Coles, Supt., shut down a couple of weeks ago, but is going to start up again, and will employ several men. This mine has been in the hands of a great many different owners. It was discovered in the year 1857 by B. Soulsby. It was afterwards taken up and sold to a San Francisco co. by M. B. Duffield. It was then shut down, and laid idle for several years. It was then taken up and worked by Kaden and Soulsby. They crushed rock that paid between 60 and 70 dollars a ton, in an anartha. Coles then did some work on the mine, while owned by them, when it was again shut down. In 1880 it was jumped by Westinghouse, who sold out to Coles. It is now owned by parties who intend to work it as it should be worked. The rock and metal (or sulphurets) is the same in appearance as the old Soulsby mine, and it is supposed to be an extension of it. They have good hoisting works and pumps now on the mine. Adjoining this mine is a mine known as the "L. Soulsby mine." This mine will also start up under a company, as soon as the other is under good headway. There is a splendid rock in this mine, the ledge varying in width. In some places it is one and a half feet wide. The shaft is down fifty feet, and the ledge still continues to look fine.

NEVADA.

Washoe District.

GOULD AND CURRY.—*Enterprise*, March 15: At the 2700 level they have commenced cutting out a station from which to start a drift. A donkey pump will be set up and all put in good shape to handle any water that may be encountered before starting the drift.

ALTA.—Good headway is making in the main east crosscut on the 2150 level. The ground is now blasting tolerably well. In the main west drift on this level the ground is working well. It has yet some 200 ft. to go before reaching the west wall. Occasional streaks of quartz are cut that carry metal.

BEST AND BUTCHER are excavating the station at the 2700 level. A donkey pump will be set up at this station before starting the drift. The Osborn shaft has been overhauled and put in good shape, and a new compressed air pipe has been put in from the surface down to the Sutor tunnel level.

SIERRA NEVADA.—The northeast drift on the 3100 level is being advanced at the rate of about 20 ft per week. It is still in vein material, and is going with the course of the vein. On the 2900 level are making preparations to begin active prospecting operations.

SAVAGE.—The flow of water cut in the north drift on the 2600 level appears to be decreasing somewhat. In case it does not run out in due time this water may eventually be shut back by means of a bulkhead placed across the drift.

COS. VIRGINIA.—The enlarging of the station at the 2700 level has been completed, and the double hoisting engine is being set up at the top of the winze that extends down to the 2900 level.

UTAH.—The northeast drift on the 1750 level is being advanced at the rate of about twenty ft per week. It is now out about 360 ft. The face is in vein material, with occasional streaks of quartz carrying some metal.

BELCHER.—Sufficient ore to keep the mills on the Carson river in operation is being regularly extracted. The mills will be kept running to their full capacity all summer.

CALIFORNIA.—The work of enlarging the 2700 station is completed, and the double hoisting engine is being placed in position. Are still making some repairs to the C. and C. shaft.

YELLOW JACKET.—The usual amount of ore is being extracted from the old upper levels, and the mills on the Carson river are kept in operation to their full capacity.

OPHIR.—Are extracting low grade ore on the 150 and 250 levels. Prospecting drifts are being run on both levels. The ore found is principally in the old fills.

CROWN POINT.—The usual amount of low grade ore is being taken from the old upper levels, and the mills on the river kept running.

ANDES.—The drifts are showing quartz of a promising character, and the usual amount of low grade ore is being extracted.

UNION SHAFT.—Are still cleaning out and repairing the drain drift that runs out to the Sutor tunnel on the 1600 level.

IMPERIAL.—Are drifting north and south on the old 600 level, where some favorable prospects are being obtained.

SCORPION.—The usual progress is making in the west drift, and the material shows no special change.

Columbus District.

MOUNT DIABLO.—*True Fissure*, March 15: Winze No. 5 has been sunk eight ft during the week. Its total depth is 95 ft. The south crosscut from the west drift on the third level has been stopped for the present, after reaching a length of 125 ft, and the men have been put at work sinking the incline below the third level. The work in the remaining parts of the mine presents nothing noteworthy. The work of sinking the incline is progressing favorably, except in the upraise from the third to the second level, where the ground is hard. The total amount of incline driven thus far is 149 ft. Of this 52 ft were driven this week.

COLUMBUS CON.—Since the date of the last report the usual amount of work has been done on the different levels of the mine. A small quantity of good ore is being extracted from a streak that is in the drift. There is no work of importance being done in the east drift that was started some time since from the above mentioned crosscut. The east drift from the main drift on the third level has attained a length of about 20 ft, and a quantity of very rich ore is being extracted from it daily.

Eureka District.

BREIF LOCAL NOTES.—*Eureka Sentinel*, March 15: The Hamburg tributaries are still doing well. The Fair Play mine on Alhambra Hill, is a daisy.

The Mildred mine, Secret canyon, is a splendid prospect. Wm. McCuen reports his tribute pitch in the Connolly mine improving. The Diagonal mine at Silverado is producing some very good ore. The leasers of the Colorado mine are taking out a good quantity of fair ore. Large quantities of ore are coming in from the Silver Lick mine, Adams Hill. A new shaft will be sunk in the Original Butte mine by the Silver State Company. The Rescue mine at Silverado is producing some unusually good ore at present. The Uncle Sam Tunnel at Silverado is looking well and the ore coming from it is very rich. There are a number of tributaries at work in the Queen mine at Silverado, all making big wages. Tribute pitches will be let on the quartz ledges of the Central Hill mine as soon as the snow leaves. There is an accumulation of ore at the El Dorado No. 2 mine, which will be sent to the furnaces in a few days. When the roads and trails are all broken there will be a great rush of ore to the smelters to help the spring boom. The road up to the Alexandria mine has been cleared of snow, and ore will be shipped from there during the present week. Tom Werry of Ruby Hill will lease the Snug Harbor mine, on the line of Prospect Mountain Tunnel, on application. There is pay in sight. Work has been resumed on the Uncle Sam mine, at a point near New York canyon, where some very rich ore was found years ago. A great improvement has taken place in the Clipper mine. The fissure is widening and the ore in it is increasing in size and assay value. From the best sources we get information that there is more ore broken down in the small mines of this district, awaiting shipment to the furnaces, than was ever known before. An unusually large number of mines in Eureka and adjoining districts are being leased, and the number will increase as the spring season advances. This appears to be the only good that has arisen from the late depression, but it will very likely prove of lasting benefit to the camp. We have it upon reliable authority that a new and valuable strike has been made in the Home Ticket mine on the lowest level. The main shaft will be sunk deeper and a drift carried out under the newly discovered ore body in order to work it out to advantage. So says our informant. A gentleman who has had considerable experience in our mines has visited the Dead Broke mine and reports it as being in a very flattering condition. He says there is ore on the dump and in every opening in the mine. He saw rich galena in about 40 different places. This kind of ore in the Dead Broke mine will assay upwards of \$300 to the ton. The Silver Connor mine has been pretty well snowed in during the heavy winter storms, but the snow fall having abated, the dump has been cleaned off, and the work of hoisting ore will be resumed at once. If the present thaw continues the trail and road from the mine to Eureka will be shoveled out and the ore shipped to the furnace as quickly as possible.

Taylor District.

NEW WHIM.—*Virginia Enterprise*, March 15: The Monitor people are putting up a whim on their main shaft, which must prove a great saving of labor. Last summer they had to hoist their ore by windlass, and they paid \$4 a day to the men at the crank, as well as to all others in their employ.

Tuscarora District.

INDEPENDENCE.—*Times-Review*, March 13: West crosscut No. 2, 300 level, has been extended 15 ft. No. 2, drift north, same level, advanced 17 ft. Retimbering the main drift, north where it was required, has been completed.

CENTRAL CON.—South crosscut, 150 level, extended 8 ft, and discontinued for the present. North crosscut, 150 level, extended 28 ft. Upraise on 80 level to crosscut old workings, extended 19 ft.

ELKO CON.—The main west crosscut, 200 level has been discontinued for the present. Have commenced drifting north and south on ledge No. 2. It is looking quite favorable.

GRAND PRIZE.—South crosscut on north lateral, 200 level, extended 35 ft; no change in formation. South drift, 400 level, is in 365 ft. An upraise from this drift has been started on the vein which is carried up 19 ft. Vein looks favorable.

NAVAJO.—The pump station, at the 350 level has been completed. The pump is in place and the connections will be made within the next two days. The mill will be started, and work in the mine resumed at all points in a few days.

COLORADO.

GENERAL NOTES.—*Georgetown Conrier*, March 15: The Kitty Clyde mine is working forty men and considerable good ore is being taken out. Two and a half tons of ore from the Matilda Fletcher mined last week, run 123 ounces silver per ton. Three eight-hour shifts are sinking the Mendota shaft. The ore streak is five ft wide in places. An engine and hoisting machinery is soon to be placed on the Troy mine by the Union Manufacturing Co. The Mayflower mine, near Idaho, started up work on Monday under the management of Dan Kroken. It is probable that the Little Mattie will soon be started up also. While drifting the Pay Rock mine, Messrs. Criley and Williams, lessees, made a good strike on Last Friday. They opened up a streak of ore, 12 inches wide, which runs 600 ounces silver per ton. It is reported that a company under the title of the Grand Lake Mining and Smelting Co., has bought machinery for a mill at Gaskell, Grand county, which will be built during the coming summer. The Atlas mill, at Empire Station, started up on Monday last. Mr. Sol. Robeson, the manager, says that they don't expect to stop for six months, unless some breakage compels them. Two teams are hauling milling quartz from the California lode. A good strike was made by Moore, Farris & Co. in the Joe Reynolds mine last week. In sinking a shaft from the tunnel level, following a good vein of mineral, when at a depth of about 45 ft, a large body of solid mineral was opened up, which carries large quantities of gray copper and ruby silver. It is said by solid, substantial men who are acquainted with the plans to be pursued by those interested in properties in West Argentine district, that that section will be livelier this summer than ever before. Those working mines in the district last summer were so successful that they will extend and do greater work this year. Another reason assigned for the future activity is the fact that the railroad will be completed within three miles of the district. Mr. D. C. Folsom, who is interested in the Vermont lode, on Kelson mountain, returned from Boston and other eastern places, last week. He says that since he has been

gone he has visited a number of mining sections of Colorado, and can say without a doubt that Georgetown is as good a mining camp as there is in the Rocky Mountains. It is his opinion that the present outlook for Georgetown is the best for years. More interest, he says, is being taken in this particular camp by people outside the State and outside of this section than in any other in Colorado.

THE SEVEN-THIRTY.—The tunnel level east of the Seven-Thirty mine continues in a fine body of ore which appears to go both down and up, and offers good prospects in the levels above and below. The level above is being rapidly pushed ahead to the point where the ore chimney has been opened on the tunnel level. The last lot run from this ore body, on the 8th inst., assayed 129 ounces silver per ton second class, and 246 ounces silver with 40 per cent lead for the first class, and netted \$1,287 after deducting freight, mill charges, etc. The 240-foot, 330-foot and 375-foot levels east are being pushed out in the direction of the ore body opened on the tunnel level. Each of them show fine seams of mineral. Thirty-nine tons shipped from the 1st to the 8th inst. netted \$5,456, or an average of \$140 per ton after deducting smelting charges. Some lots carried from 15 to 50 per cent lead, and were worth from \$400 to \$700 net per ton.

ARIZONA.

AUBREY DISTRICT.—*Cor. Mohave Miner*: I believe that the developments and productions of our mines should be made to speak for themselves, instead of wasting time, money and breadth trying to sell prospects for prices that only well developed mines will bring. I am a firm believer in the future of Mohave county. When the time comes that owners of claims will go to work and mine practically to obtain the fruits of their labors from the output of their mines and not hold back for buyers to offer big prices for prospects, then Mohave county will begin to receive the attention its mineral resources deserve. Then the long-looked for boom will come, as capital always seeks investments where good returns can be had on a reasonable outlay. We have markets for our ores both at home and abroad and in my opinion there are hundreds of prospects in Mohave county that will produce enough good ore in the work of development to pay the expenses of the same. I have been in a dozen different districts in this county and I have the first one yet to see that has not only one but several fine prospects, the equal of which is not to be found in the territories. The developments as yet are hardly sufficient to attract the attention of heavy capitalists. The Wallapai range has an extraordinary showing. For length of well defined belts, strong ledges, contact formations, good character and quality of ores on the surface, its equal cannot be found and future developments will substantiate it. Inside of two years Mohave county will take its proper place in the estimation of the mining community, and labor will have its reward. I base my opinion on observation and tests of ores taken from the different districts, not taking anyone's say so regarding the quality of the ores, as I believe the furnace is a better test than either the eye or judgement. This part of the county is coming to the front, especially that portion called the Grooms Peak country by some and Tillman basin by others.

IDAHO.

MINING SALES.—*Ketchum Keystone*, March 16: C. P. Smith's interest in the Mattie mine on Trail creek, about six miles east of Ketchum, has been sold through Judge Lewis to Geo. M. Snow, the Banker. The Mattie has shown itself to be a very bright prospect in the possession, near the surface, of a compact vein of galena in a ledge of iron and low grade oxides. Some very fine specimens have been brought from the mine. The situation of the Mattie is very convenient and advantageous for immediate operation, and it is easily accessible. Mr. Snow is a gentleman of means, and we expect to see the property strike out for development in the coming season.

COEUR D'ALENE TOWNS.—Snow is three ft deep at Eagle City, Coeur d'Alene, and 11 ft deep on the mountains of the Belknap trail. The east immigration for May is estimated at 25,000. Four new towns are laid off in the country as follows: Butte creek, one-half mile below the Widow claim, crossing of Evolution trail and Pritchard creek, and at the mouth of Eagle creek.

BULLION SHIPMENT.—From the Vienna Company's mill, at Vienna, March 6th, 2 bars, Nos. 128 and 129; weight, 241 pounds; value, \$2,485. March 9th, 3 bars, Nos. 130, 131 and 132; weight, 350 pounds; value, \$3,699. March 8th, 3 bars, Nos. 133, 134 and 135; weight, 369 pounds; value, \$3,877.

MONTANA.

A STEADY DIVIDEND PAYER.—*Butte Inter-Mountain*, March 11: The Original mine is now the steadiest dividend payer in the western territories. The thirty-first consecutive monthly dividend of \$3,000 and making a total of \$93,000 was declared on the 1st inst. and has since been paid. The development of the mine proceeds as usual. On the 400 level, where for a time the ore body appeared broken up and where considerable prospecting was required in yielding an excellent quality of ore from a compact and well defined streak varying in width from one to two ft and sampling about \$500 per ton. The level also shows an abundance of second class ore assaying from \$40 to \$60 per ton. The Moulton looks fully as well as it has done at any time since the December strike was made. On the 400 level the new ore body is producing well from drifts and stopes. The sinking of the 400 foot winze has been suspended for some time on account of water. It showed a fine vein of ore of uniform quality all the way down. The main shaft of the Liquidator having been sunk to a depth of 300 ft, a crosscut has been extended to the vein. The walls were found intact and the ore body, though of somewhat low grade at the place of intersection, is as compact and wide as ever. Drifts have been started and a great improvement has taken place in the quality of the ore. The two mills are running smoothly. The Anaconda continues to be the heaviest producer in the territory, but no attempt is being made to crowd the production. The only ore now being extracted is taken out in the necessary work of advancing the drifts.

THE MOUNTAIN VIEW.—*Inter-Mountain*, March 12: The appearance of the Mountain View mine continues to improve. On the 500-foot north level

the east drift shows a handsome face of high grade copper ore. The south vein is being actively developed. The south crosscut from the 400-foot station has penetrated the ledge for a long distance, and opened up 20 ft of good concentrating ore, besides streaks of copper glance and pyrites. The hanging wall has not yet been reached. The south crosscut from the 300-foot station has not yet reached the foot wall, but is being driven vigorously ahead in that direction. The future of the Mountain View is assured, and it will soon rank as a producer with the leading copper properties of the Butte district.

THE DRUM LUMMON STRIKE.—*Cor. Butte Inter-Mountain*, March 12: Ere this, no doubt, you have been informed that the lower or Maskelyne tunnel has cut the Drum Lummon lode. To-day I had the pleasure of examining some of the ore taken from the late strike, and was surprised to find it of much finer quality than that found in the upper levels. Free gold and sulphides of silver could be seen with the unaided eye in that examined. The point at which this tunnel pierces the vein is 400 ft vertically below the outcrop, but as the vein dips southerly 70 degrees from the horizontal for 200 ft in depth then at a greater angle, it will be readily seen that the body of ore has a much greater height than 400 ft. The air drills have now been working about 48 hours, cutting across the bonanza, and no sign of hanging wall yet. The quartz samples \$64 50 per ton in gold and silver.

NEW MEXICO.

LAKE VALLEY.—*Rio Grande Republican*, March 11: Mining matters at Lake Valley continued to improve during the week just passed. Sierra Grande has come to the front with a shipment of high galena. In the meantime, the mill runs steadily on low grade ore, making handsome returns. The concentrators, under the immediate supervision of Dr. Taylor, are proving a success.

SIERRA APACHE.—Developments this week are encouraging. An occasional carload of high grade ore being the result of a very trifling expenditure by the company.

OREGON.

GENERAL NOTES.—*Jacksonville Times*, March 14: The Palmer creek diggings are being operated with success. Most of the miners have been able to do something during the week. Miners of Steamboat district have plenty of water and are doing well. Josephine county miners now have plenty of water and are making the most of it. Supt. Ennis of the Sterling mine has two giants busily at work. He expects to make a four-months run at least. More snow lies on the hills now than at any time during the winter, which will no doubt prove beneficial to the miners. The copious rains the forepart of the week did the miners go d, and they hope to see them repeated at once. Edson Bros. have purchased the big ditch in Siskiyou county of the defunct Yreka Creek Mining Co. and will repair it immediately. Walter Simmons of Galice creek made a cleanup not long since, after a 16 days run, and got \$800. He has struck a rich channel. J. T. Layton of Applegate has a force of men engaged in cleaning out his extensive ditch and will probably be at work this week. N. De Lamatter has both his claims near Kertyville running on full time and expects to make an excellent showing at the end of the season. J. Griffith, who is engaged in prospecting for quartz in the Hungry Creek section, just across the Oregon line, was in town Tuesday. He has high hopes of striking it rich. The miners of Willow Springs precinct are all busy and most of them have a good supply of water. Benner & Co. are at work as also D. M. Marden who has the Kane creek ditch rented.

UTAH.

REVIEW.—*Salt Lake Tribune*, March 13: The movement of metals for the week has been quite sluggish. The deplorable casualty at Alta, where ten men and two women lost their lives in a snow-slide, which, at the same time, swept away the New Emma works and machinery, has thrown a gloom over mining circles. The receipts of bullion in Salt Lake City for the week ending March 12th, inclusive, were \$101,177 95; of ore, \$9,600; aggregate, \$110,777 95. Last week the aggregate was \$120,525 22, of which \$111,645 22 was bullion. The shipments for the week ending March 8th, inclusive, were as follows: Forty-three cars bullion, East, 1,079,786 pounds; 6 cars white lead, East, 174,099; 1 car white lead, West, 20,000; 11 cars ore, East, 120,000; 61 cars, 1,391,885 pounds. The receipts of the Horn Silver Co. for the week were 14 cars, of the value of \$42,000, bringing the total for the year up to \$417,000. The Ontario shipments for the week were 28 cars, \$33,527 95, bringing the total for the year up to \$323,358 04. The Crescent made three shipments of ore during the week, amounting to \$9,600. The Stormont sent up one shipment, three bars of silver, amounting to \$5,150. The product of the Hanauer smelter for the week was ten cars of bullion, \$20,500.

PARK CITY.—*Record*, March 15: We have reliable authority for stating that the Empire will resume operations. Mr. Sampson, one of the former owners, and four other capitalists, have put in \$25,000 each, making \$125,000 with which to begin work. The company has been re-organized, and no stock will be placed on the market at present, nor until it is determined that there is a mine there. This amount of capital is put up for the purpose of fully developing the property, and if more is needed it will be forthcoming. The mine is at present almost entirely free from water, and the cost of pumping, which heretofore was one of the greatest expenses, will be very light. The water which stood in the mine for a long time did very little damage, as there are only two small caves resulting from it, and they can be fixed up at a small cost. We understand that work will commence immediately.

ORE SHIPMENTS.—Received at Mackintosh's Sampling works from the Crescent Mining Co. in last five days, 471,720 pounds of bullion. The Crescent shipments were cut off Sunday, Monday and Tuesday on account of the severe snow storms, which were the most severe of this season. The Sampson has shipped this week nearly two car loads of ore. The Apex has not been heard from as a shipper for some time past, on account of the impassable condition of the roads.

For Mining Shareholders' Directory, Stock Reports, etc., see page 216.

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Ingersoll, D2 3", large ports.....	1.785 ft. per hour.
Ingersoll, E, 3 1/2", medium ports.....	1.601 " "
National, improved, 3 1/2".....	1.280 " "
Rand, improved, 3 1/2".....	1.041 " "
Ingersoll, D2 3", beat Rand 3 1/2".....	.744 " "
Ingersoll, D2 3", beat National 3 1/2".....	.565 " "
Ingersoll, E, 3 1/2", beat National 3 1/2".....	.560 " "
Ingersoll, E, 3 1/2", beat National 3 1/2".....	.321 " "
National beat Rand.....	.139 " "

[ESTABLISHED 1864.]

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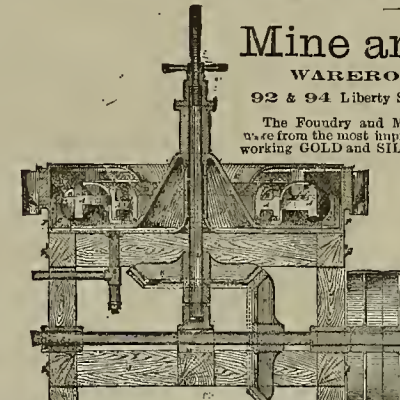
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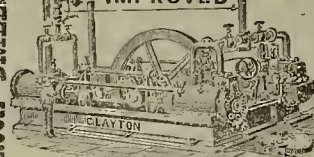
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List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.]

FOR WEEK ENDING FEBRUARY 26, 1884.
291,304.—REVOLVING CYLINDER ENGINE—J. Blair, Tacoma, W. T.
294,198.—SOFA BED—W. A. Clark, S. F.
294,220.—ALARM CLOCK—I. S. Goldman, Pasadena, Cal.
294,254.—FOLDING MAP RACK—F. P. Montgomery, San Jose, Cal.
294,270.—COMMUTATOR FOR DYNAMO OR MAGNETO ELECTRIC MACHINE—Rae & Healy, S. F.
294,288.—MEDICAL COMPOUND—Geo. Taylor, Redding, Cal.
294,293.—CIGAR AND MATCH HOLDER FOR TABLES—J. P. Walch, Suto, Nev.
294,175.—CRYPTOGRAPHICAL TABLE—J. L. Winneba, S. F.
3,930.—LABEL—B. Farley, S. F.
3,934.—LABEL—G. H. Holbrook, Portland, Or.

FOR WEEK ENDING MARCH 11, 1884.
295,097.—BRICK CUTTING MACHINE—T. M. Bannister, Lone Pine, Cal.
294,974.—HEN'S NEST—Ira B. Dillon, Visalia, Cal.
294,860.—FIRE ESCAPE—Elam Dye, S. F.
294,777.—WOOD WORKER'S DOG—John Forbes, S. F.
294,869.—NECKTIE FASTENER—O. M. Graves, Dayton, W. T.
294,895.—TIRE TIGHTENER AND JACK—McClosky & Tozier, Walla Walla, W. T.
294,805.—VENTILATING MINING SHAFTS—W. Phillips, Coos Bay, Or.
294,807.—OPERATING VALVES OF STEAM CYLINDERS—E. L. Reese, Newark, Ca.
294,923.—BELT HINGE—Eugene Smith, S. F.
295,065.—WASHING MACHINE—R. Smith, Cottage Grove, Or.
294,925.—PACK SADDLE—Smith & Hunter, Lone Pine, Cal.
294,927.—STEAM BOILER—Jos. Stevens, S. F.
294,932.—POULTRY FOUNTAIN—J. C. Tappeiner, Bisbee, A. T.
294,937.—HOSE PATCH—Geo. W. Towle, San Rafael, Cal.
294,943.—WINDMILL—Chas. W. White, Santa Rosa, Cal.
294,948.—GRIP FOR CABLE R. R.—J. W. Young, Ft. Maroni, A. T.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Mining Share Market.

With the exception of a few spurts, strikes have been rather dull all the week. Work is progressing as usual on the big mines of the Comstock, but no strikes are to be recorded. In the Union Con., on the 3000 level, a series of crosscuts is being run, at the ends of which the diamond drill is being put in for the purpose of tapping and drawing off the water. As soon as the water shall have run down sufficiently, the crosscuts will be advanced. These crosscuts are about 100 ft apart, and will pretty thoroughly explore the ground lying to the east of the main north and south drift.

In the Sierra Nevada the circulation of air is being regulated for the purpose of beginning prospecting operations on the 2900 level, where are some promising streaks of ore. During the advancement of the north lateral drift on the 2900 level, streaks of quartz assaying from \$2 to \$3 were passed through.

At the California and Con. Virginia they are now placing in position at the 2700 station a double hoisting engine, and when this goes into operation they will commence drifting from the bottom of the winze on the 2900 level.

At Gold Hill the several leading mines are taking out a sufficient amount of ore to keep the mills on the Carson river in constant operation. Plenty of ore will be found to keep the mills going all summer.

COAL.—In another column will be found the advertisement of Messrs. J. Macdonough & Co., 41 Market street, the leading importers and dealers in all kinds of foreign and domestic coal, coke and pig iron. Having discharging, and at all times large stocks on hand, an order for any quantity, large or small, will receive prompt and careful attention. Their stock embraces the best minings and brands of these articles, all being selected with regard to purity and excellence, a great item when expense of transportation is considered. They are in constant receipt and make specialties of Lehigh and Cumberland blacksmith coal and English foundry and smelting coke. To country merchants, manufacturers, foundrymen, mining men and others, special inducements are offered in what they may require in their line, and all who may favor this firm with a share of patronage will experience entire satisfaction both regarding price and quality.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replanted, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

THE CONR D'Alene mines seem determined to allow no Chinese miners in the camp. They will let the Mongolian cook or wash, but not do any mining work at all.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alpha Hydraulic M Co.	California.	4.	2.00.	Feb. 6.	Mar. 8.	28. A. J. Jordon.	320 Sansome st.
Alta S M Co.	California.	5.	25.	Jan. 25.	Mar. 25.	P. M. Scott.	326 Montgomery st.
Belle Isle M Co.	Nevada.	7.	20.	Mar. 12.	Apr. 17.	W. H. Watson.	302 Montgomery st.
Belmont M Co.	Nevada.	36.	75.	Feb. 20.	Mar. 31.	S. J. W. Pew.	310 Pine st.
Benton Con M Co.	Nevada.	12.	20.	Feb. 5.	Mar. 11.	J. W. Pew.	310 Pine st.
Best & Belcher M Co.	Nevada.	26.	50.	Feb. 9.	Mar. 14.	W. H. Watson.	331 Montgomery st.
California M Co.	Nevada.	11.	20.	Mar. 14.	Apr. 21.	W. Willis.	303 Montgomery st.
Champion M Co.	California.	14.	07.	Mar. 7.	Apr. 10.	C. P. Gordon.	309 Montgomery st.
Con Virginia M Co.	Nevada.	20.	20.	Mar. 12.	Apr. 16.	Theo. Wetzel.	522 Montgomery st.
Cueva Santa M Co.	Mexico.	1.	5.	Mar. 4.	Apr. 7.	A. M. Havens.	309 Montgomery st.
Diana G M Co.	Nevada.	5.	10.	Mar. 5.	Apr. 9.	O. W. McLusken.	310 Pine st.
Excelsior Water Co.	California.	6.	50.	Jan. 29.	Apr. 15.	P. J. Flanagan.	348 Pine st.
El Dorado M Co.	Nevada.	2.	08.	Mar. 6.	Apr. 9.	H. B. Wheaton.	215 Sansome st.
Elko Con M Co.	Nevada.	3.	15.	Mar. 4.	Apr. 8.	J. H. Sayre.	330 Pine st.
Gould and Curry M Co.	Nevada.	47.	50.	Feb. 23.	Mar. 25.	P. Sperling.	309 California st.
Grand Prize M Co.	Nevada.	15.	25.	Feb. 23.	Apr. 3.	A. K. Durbow.	309 Montgomery st.
Gorilla M Co.	Cal.	3.	15.	Feb. 27.	Mar. 31.	E. M. Hale.	327 Pine st.
Head Center M Co.	Arizona.	4.	10.	Jan. 29.	Mar. 4.	A. A. Enquist.	436 Montgomery st.
Independence M Co.	Nevada.	13.	20.	Mar. 12.	Apr. 16.	J. W. Pew.	310 Pine st.
Indian Spring Drift M Co.	California.	1.	30.	Feb. 12.	Mar. 19.	J. W. Pew.	310 Pine st.
Jupiter Deep Blue Gravel M Co.	Cal.	1.	1.00.	Dec. 17.	Feb. 16.	A. A. Paul.	320 Montgomery st.
Justice M Co.	Nevada.	40.	10.	Mar. 3.	Apr. 7.	G. Lande.	426 California st.
Lake County Quartz M Co.	California.	8.	12.	Mar. 10.	Apr. 16.	R. E. Kelly.	419 California st.
Loreto M & M Co.	Mexico.	6.	50.	Feb. 23.	Mar. 25.	A. Baird.	430 California st.
Morgan M Co.	California.	10.	60.	Feb. 27.	Apr. 7.	C. H. Jones.	327 Pine st.
Mammoth ear M Co.	California.	5.	15.	Mar. 14.	Apr. 18.	C. L. Tilden.	806 Market st.
Milton M Co.	California.	1.	1.00.	Feb. 14.	Mar. 24.	J. W. Pew.	310 Pine st.
Mayflower Gravel M Co.	Cal.	23.	15.	Mar. 5.	Apr. 6.	H. Pichior.	320 Sansome st.
North Gould & Curry M Co.	Nevada.	6.	25.	Feb. 23.	Apr. 2.	J. Morio.	328 Montgomery st.
New Coso M Co.	California.	17.	40.	Jan. 18.	Feb. 28.	C. H. Mason.	310 Montgomery st.
Northern Belle.	Nevada.	2.	8.00.	Jan. 30.	Mar. 10.	E. B. Clement.	710 Washington st.
Ophir M Co.	Nevada.	46.	50.	Feb. 2.	Mar. 6.	W. Willis.	309 Montgomery st.
Puget Sound Iron Co.	Washington.	7.	1.00.	Mar. 25.	Apr. 25.	E. B. Holmes.	309 Montgomery st.
Pedro Coro M Co.	Arizona.	1.	5.	Feb. 23.	Apr. 7.	A. Halsey.	323 Montgomery st.
Pleasant Valley M Co.	Cal.	3.	10.	Mar. 3.	Apr. 7.	J. Stadel.	310 California st.
Savage M Co.	Nevada.	58.	50.	Feb. 5.	Mar. 10.	E. C. Elliott.	303 Montgomery st.
Sierra Nevada S M Co.	Nevada.	78.	1.00.	Jan. 16.	Feb. 20.	E. B. Holmes.	309 Montgomery st.
Union Con M Co.	Nevada.	26.	1.00.	Mar. 6.	Apr. 8.	E. L. Parker.	309 Montgomery st.
Wildman M Co.	California.	25.	25.	Feb. 13.	Mar. 28.	J. M. Buntington.	309 California st.
						R. Elliot.	310 Pine st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Champion M Co.	California.	Theo. Wetzel.	422 Montgomery st.	Annual.	Apr. 8.
Marshall M Co.	California.	R. Wegner.	414 California st.	Annual.	Mar. 12.
Melones Con M Co.	California.	E. M. Hall.	309 Montgomery st.	Annual.	Mar. 25.
Jackson M Co.	California.	D. C. Bates.	309 Montgomery st.	Annual.	Mar. 24.

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Mar. 15.
Bulwer Con M Co.	California.	W. Willis.	309 Montgomery st.	10.	Jan. 23.
Contention Con M Co.	Arizona.	D. C. Bates.	309 Montgomery st.	25.	Jan. 12.
Derbee Blue Gravel M Co.	California.	T. Wetzel.	322 Montgomery st.	10.	Mar. 15.
Elko M Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Dec. 15.
Jackson M Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar. 19.
Kentuck M Co.	Nevada.	J. W. Pew.	310 Pine st.	10.	Mar. 19.
Standard Con M Co.	California.	Wm. Willis.	309 Montgomery st.	25.	Mar. 12.
Silver King M Co.	Arizona.	J. Nash.	315 California st.	25.	Dec. 15.
Synthetic M Co.	California.	J. Stadel.	419 California st.	10.	Mar. 5.

San Francisco Metal Market.

(WHOLESALE.)
THURSDAY, MAR. 20, 1884.

VINTIMONY—Per pound.	14 @ 5
IRON—American Pig, soft, ton.	28 00 @
Scotch Pig, ton.	24 00 @ 26 00
American White Pig, ton.	— @ —
Oregon Pig, ton.	— @ —
Clippier Cap, Nos. 1 to 4.	— @ —
Refined Bar.	33 @ 34
Horsehoes, keg.	5 50 @
Nail, Roll.	— @ —
Crown, according to thickness.	7 @ 8
SEL—English Cast, lb.	14 @ 15
Black Diamond, ordinary sizes.	14 @
Drill.	15 @ 16
Drill machinery.	12 @ 14
COPIERS—Ink.	22 @
Braziers' sizes.	330 @ 35
Fire-box sheets.	1 @
Nails.	17 @
Bolt.	28 @
Old.	8 @
Bar.	8 @
Cement, 100 lbs.	12 @
LEAD—Pig.	4 @ 4
Bar.	5 @ 6
Sheet.	7 @
hot, discount 10% on 500 bag s: Drop, 2 bag.	2 10 @
Buck, pig bag.	2 00 @
Unfilled, do.	2 50 @
TEX PRIZES—Charcoal.	6 00 @ 6 75
Coke.	5 50 @ 5 75
Banca Tin.	24 00 @
Australian.	21 50 @
L. C. Charcoal, offing, H&X20.	6 @ 6 60
ZINC—By the cask.	19 @
Sheet, 7x3 ft. 7 to 10 lb. less the cask.	9 @ 10
N ILS—A-sorted sizes.	3 25 @
QUICKSILVER—By the flask.	34 @ 34 1/2
Flasks, new.	1 05 @
F k s, old.	35 @

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Bullion Shipments.

Crescent, March 12, \$2,900; Hanauer, 12, \$2,050; Horn Silver, 12, \$5,000; Ontario, 12, \$4,750; Hanauer, 13, \$4,100; Crescent, 13, \$3,350; Horn Silver, 13, \$6,000; Ontario, 13, \$4,439; Horn Silver, 15, \$6,000; Ontario, 15, \$4,137; Hanauer, 16, \$2,050; Horn Silver, 16, \$12,000; Vienna, 16, \$3,000; Ontario, 16, \$4,314; Paradise Valley, 16, \$3,698; Mt. Cory, 18, \$21,000; Bonanza King, 18, \$6,046; Contention, 18, \$14,566.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.
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C. D. McDEFFER—Sacramento county.
JOHN H. STURCK—Santa Clara county.
B. W. CROWELL—Merced and Stanislaus counties.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING FEB. 23.	WEEK ENDING MAR. 6.	WEEK ENDING MAR. 13.	WEEK ENDING MAR. 20.
Alta.	1.05	2.00	1.10	1.50
Alpha.	1.55	1.75	1.75	1.50
Andes.	.30	.40	.40	.25
Argenta.	.05	.05	.05	.05
Belcher.	.90	1.00	1.10	.95
Belmont.	2.60	2.90	3.00	2.50
Best & Belcher.	.60	.90	.85	.60
Bullion.	.60	.90	.85	.60
Bonanza King.	.35	.40	.35	.30
Belle Isle.	8.00	9.50	10.00	10.25
Benton.	.15	.80	.15	.30
Bodie Tunnel.	.20	.25	.15	.20
Bulwer.	.25	.30	.25	.20
California.	.25	.30	.25	.20
Challenger.	.25	.30	.25	.20
Chollar.	2.25	2.70	2.55	2.00
Confidence.	1.50	1.30	1.50	1.25
Con. Imperial.	.30	.30	.30	.30
Con. Pacific.	.30	.30	.30	.30
Crown Point.	1.00	1.20	1.15	1.00
Day.	2.20	2.40	2.25	2.00
Eureka.	5.00	4.70	3.20	3.50
Eureka Tunnel.	.40	.45	.40	.35
Exchequer.	.15	.15	.15	.15
Grand Prize.	.75	2.05	1.60	1.90
Gould & Curry.	1.10	1.10	1.10	1.10
Hale & Norcross.	2.15	2.30	2.30	2.15
Holmes.	.15	.15	.15	.15
Independence.	.25	.30	.10	.15
Julia.	.15	.15	.15	.15
Justice.	.15	.15	.15	.15
Martin White.	.75	.80	.65	.35
Mono.	1.25	5.01	1.45	1.60
Mexican.	2.40	2.70	2.10	2.45
Mt. Diablo.	2.00	2.50	2.25	2.50
Northern Belle.	2.00	2.50	2.25	2.50
Navajo.	2.05	2.70	2.10	2.35
North Belle Isle.	.25	.25	.25	.25
Occidental.	1.00	1.10	1.05	1.00
Ophir.	1.10	1.10	1.10	1.10
Overman.	.30	.30	.30	.30
Potosi.	1.15	1.40	1.05	1.25
Pinal Con.	.70	.95	.65	.80
Savage.	.70	.95	.65	.80
Sierra Nevada.	3.45	3.81	3.10	3.60
Silver Hill.	.10	.10	.10	.10
Silver King.	6.00	6.00	6.00	6.00
Scorpion.	.40	.45	.40	.35
Synthetic.	.80	.80	.80	.80
Tioga.	.30	.30	.30	.30
Union Con.	3.00	3.25	3.10	3.00
Utah.	1.85	2.10	2.00	1.70
Yellow Jacket.	2.25	2.70	2.40	2.45

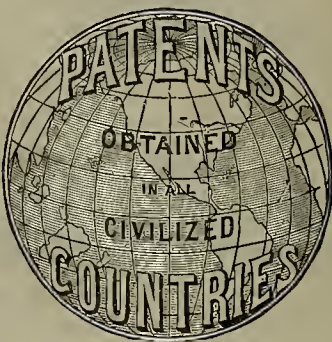
Sales at San Francisco Stock Exchange

THURSDAY A. M., MAR. 20.	AFTERNOON SESSION.
75 Alta.	1.55
65 B. & Belcher.	2.50
130 Belcher.	2.50
150 Benton Con.	3.00
150 Belle Isle.	2.00
5 Belcher.	3.50
80 Confidence.	1.00
100 Day.	2.00
200 Eureka Con.	4.10
230 Exchequer.	2.30
450 Hale & Nor.	1.40
50 Mexican.	2.00
250 Mono.	1.80
275 Navajo.	2.90
200 Ophir.	1.60
200 Sierra Nevada.	3.80
500 Silver Hill.	6.00
150 Union Con.	3.10
130 Utah.	1.85
150 Yellow Jacket.	2.25

Lost Papers.

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Dewey & Co.'s Scientific Press Patent Agency.



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DEWEY & CO., Patent Agents.
No. 252 Market St. Elevator, 12 Front St., S. F. Telephone No. 658.

A. T. DEWEY. W. E. EWER. GEO. H. STRONG.

DELINQUENT NOTICE.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador county, near Drytown, California.

NOTICE.—There are delinquent, upon the following described stock, on account of assessment (No. 44) levied on the 30th day of January, 1884, the several amounts set opposite the names of the respective shareholders as follows:

NAMES.	No. Certificate.	No. Shares.	Amount.
Bartlett, J. O.	47	405	\$12 15
Claws, George.	49	75	2 25
Eastman, E. D.	480	200	6 00
Elwell, Mrs. N.	335	50	1 50
Elwell, Octave.	468	50	1 50
Harris, James.	50	50	1 50
Harris, James.	57	50	1 50
Harris, James.	58	50	1 50
Jewett, Thomas A.	441	150	4 50
Jewett, Harriet A.	442	175	5 25
Jewett, Arthur.	440	475	14 25
Knox, Joseph A.	228	100	3 00
Knox, Joseph A.	229	100	3 00
Knox, Joseph A.	230	100	3 00
Knox, Joseph A.	231	100	3 00
Knox, Joseph A.	232	100	3 00
Knox, Joseph A.	233	100	3 00
Knox, Joseph A.	234	100	3 00
Knox, Joseph A.	235	100	3 00
Knox, Joseph A.	236	100	3 00
Knox, Joseph A.	237	100	3 00
Knox, Joseph A.	238	100	3 00
Knox, Joseph A.	239	100	3 00
Knox, Joseph A.	240	100	3 00
Knox, Joseph A.	241	100	3 00
Knox, Joseph A.	242	45	1 35
Knight, J. M.	206	125	3 75
Lagomazirino, C.	49	75	2 25
Lagomazirino, C.	50	60	1 50
Miller, W. J. Trust.	243	1,750	53 50
Mitchell, Mary J.	243	250	7 50
Mitchell, Susie E.	264	250	7 50
Parsons, C. A.	477	500	6 00
Pratt, Freeman.	496	50	1 50
Rogers, William A.	453	100	3 00
Rogers, William A.	454	150	4 50
Rogers, George P.	455	400	12 00
Stone, W. W.	292	200	6 00
Shiff, Gustave.	136	125	3 75
Shiff, Gustave.	137	100	3 00
Shiff, Gustave.	138	100	3 00
Shiff, Gustave.	139	100	3 00
Shiff, Gustave.	140	100	3 00
Shiff, Gustave.	141	100	3 00
Trefethen, George.	101	150	4 50
White, John S.	100	375	11 25
Wilson, John S. Trustee.	203	250	7 50
Winter, Elisia S.	177	125	3 75

F. A. HUNTINGTON, SAW, SHINGLE, AND QUARTZ MILL MACHINERY.

We Call Attention to the Following Testimonials as to the Capacity and Durability of the Centrifugal Roller Quartz Mill:

SAN FRANCISCO, Dec. 27, 1883.

Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR:—The four-foot Centrifugal Roller Mill, bought of you in August, 1882, for the Whidden Gold Mining Company, of Shingle Springs, has given entire satisfaction, both on our own and on custom work, saving from 85 to 90 per cent of the gold in the mill. In conclusion I will say that we are so well pleased with it that Mr. Whidden and myself are putting one of the same size on the Tohonga gold mine, near Ravena, in Los Angeles county.

Yours truly, P. VEASEY,
34 California St., S. F.

FINE GOLD GULCH, Nov. 10, 1883.

Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR:—In reply to your inquiry concerning the working of your Centrifugal Roller Quartz Mill, I am pleased to say that I run one of them for seven months, doing custom work on different varieties of rock, and that the mill gave satisfaction in every respect, and did all that you claim for it.

Yours truly, BYRON JENNINGS.

GARIBALDI MINE, Dec. 17, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR:—In reply to yours of the 10th inst., I take pleasure in assuring you that your Centrifugal Roller Quartz Mill gives entire satisfaction, and I can heartily recommend it to mining men who want a cheap and efficient crusher.

Yours truly, E. I. PARSONS, Supt.

32 WASHINGTON AVENUE, 1
SAN FRANCISCO, Dec. 29, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR:—Having run one of your Centrifugal Roller Quartz Mills on sample lots of rock from more than twenty different mines, I must say that in every instance it has given the best of satisfaction in every particular; and I recognize its superiority over any other mill manufactured.

Very truly yours, D. O. MOWRY.

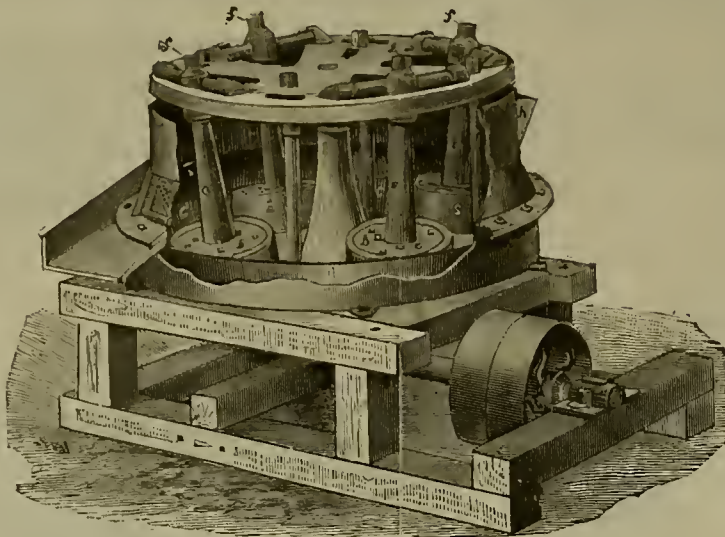
MILLS ERECTED WITH ALL APPLIANCES COMPLETE.

F. A. HUNTINGTON, 45 Fremont St., San Francisco.

32 SAMPLE LOTS OF ORE WORKED.

CAPACITY AND DURABILITY GUARANTEED.

32 WHERE A MACHINE CAN BE SEEN IN OPERATION.



CENTRIFUGAL ROLLER QUARTZ MILL.

The work done by the Centrifugal Roller Quartz Mill, during the past two years, on various mines and different kinds of rock, proves all that is claimed for it, viz:

1. The cost of same capacity is not more than one-half that of stamps.
2. Freight to mine one-fourth that of stamps.
3. Cost of erection at mine one-tenth that of stamps.
4. It runs with one-third the power per ton of ore crushed.
5. The wear is less than that of stamps.
6. The wearing parts are easily duplicated.
7. It has a much better discharge, and leaves the pulp in better condition for concentrating.
8. It is a better amalgamator, saving fully nine-tenths of the gold in the mill; the balance can be saved on plates in the usual manner.
9. It is continually crushing; not like the stamp, using power to suspend it in air ninety-nine one-hundredths of the time and the balance making a thundering noise, and accomplishing comparatively small results. It is as far in advance of the stamp mill as the present method of making flour with improved rolls is over the Indian's mode of crushing corn in a stone mortar.

PATTEN'S CONCENTRATOR.

This machine requires less power, less care or attention, and is less liable to get out of repair than any concentrator now in use; all of which any practical miner will comprehend when seeing it in operation.

SONORA, CAL., Dec. 1, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR:—In reply to yours of recent date, inquiring about the Centrifugal Mill which I bought of you, I will say that I have run the mill four months on hard rock; and I take pleasure in adding that the mill has in every way given the best of satisfaction.

Yours truly, J. H. NEALE.

GARIBALDI MINE,
Calaveras Co., Cal., Dec. 17, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR:—In answer to your inquiry concerning the working of the five feet Centrifugal Mill, bought of you for the Garibaldi mine in Calaveras county, I take pleasure in saying it gives entire satisfaction in every respect, and I only regret that the mine does not warrant the purchase of more of them and the continued use of the one now in operation.

Very truly yours, O. B. SMITH.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR:—Your Centrifugal Roller Quartz Mill has run on the Whidden Gold Mining Co. property at Shingle Springs, El Dorado Co., Cal., about four months, and it has done good and satisfactory work, a greater proportion of gold remaining in the mill than in the stamp battery.

FRED JONES, Supt.

HILBRETH RANCH, Fresno Co., Cal.,
January 11, 1884.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR:—In regard to your mill (Centrifugal Roller), I have crushed about 500 tons of rock in the mill, and am glad to say that it has given entire satisfaction, and can recommend it to the public as the most expeditious and least expensive method for crushing and milling ore that I have ever seen.

Truly yours, THOS. HILBRETH.

TATUM & BOWEN,

25, 27, 29 and 31 Main St., near Market, SAN FRANCISCO, and 187 Front Street, PORTLAND, OREGON.

SOLE AGENTS FOR

The Albany Lubricating COMPOUND AND CUPS, The Albany Spindle Oil, THE ALBANY VALVOIL,

THE ALBANY CYLINDER OIL, The Sight Drop Cylinder Lubricator.

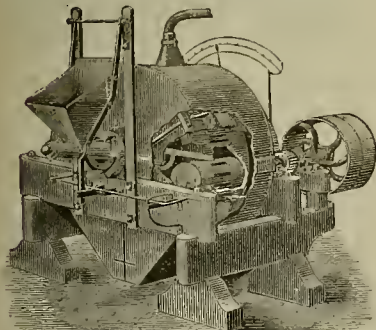


WE ALSO IMPORT

LARD OIL, WEST VIRGINIA LUBRICATING OIL, DOWNER'S MINERAL SPERM SKID OIL, ETC.

32 These Lubricants have been for the last eight years, and are now, in general use in nearly all the mills, mines and steamers on this Coast, and the fact that the demand constantly increases is sufficient evidence of their superiority.

Tustin's Pulverizer



WORKS ORE WET OR DRY.

Awarded SILVER MEDALS in 1882 and 1883
By Mechanics' Institute.

MANUFACTURED AT

The Tustin Windmill Horse-power and Pumping Machine Works.

308 Mission Street, S. F., Cal.

By W. I. TUSTIN, Inventor and Patentee.

32 Send for Circular.

DIVIDEND NOTICE.

OFFICE OF THE
Standard Consolidated Mining Company.

San Francisco, March 1, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 65, of twenty-five cents (25c.) per share, was declared, payable on WEDNESDAY, March 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.

OFFICE—Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

ASSESSMENT NOTICE.

Gould and Curry Silver Mining Company.

ASSESSMENT No. 47.

Levied.....March 7, 1884
Delinquent.....April 11, 1884
Day of sale.....May 5, 1884
Amount.....Fifty cents per share

ALFRED K. DURBROW, Secretary.

OFFICE—Room No. 69, Nevada block, No. 309 Montgomery Street, San Francisco, Cal.

Dewey & Co., 252 Market St., Patent Ag'ts.

GOLD MEDAL AWARDED

—AT—
Mechanics' Fair, 1883,

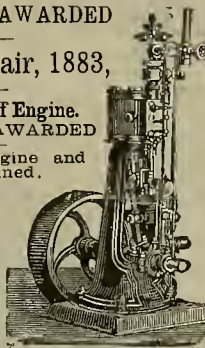
—FOR—
Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
—FOR—
Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and

Engine Works,

109 & 111 Beale St.,
SAN FRANCISCO.



TO THE LADIES.

MRS. ADCOCK, having just returned from the East, begs to offer to the public some of the FINEST GOODS ever imported to this coast at prices lower than ever before. 32 An inspection is solicited.

10 Kearny Street,
Band Box, 748 Market St., S. F.,
And First and Main Sts., Portland.

CLARENDON HOUSE,

574 Folsom Street, N. E. Cor. Second, S. F.
ENTIRELY RENOVATED & NEWLY FURNISHED.

Sunny Suites and Single Rooms with or without Board at reasonable rates. Hot and Cold Water. Folsom street cars pass the door. Location and Appointments unequalled in San Francisco.

Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First street, a Rutherford Pulverizer, an improved revolving barren crusher, which was only used a few times and is as good as new. It will be sold very much below costs, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. References as to above can be had upon applying to this office.

WANTED

TO BUY—A MINING PROPERTY. California gold quartz preferred. Don't want mine to stock, but to work as an individual enterprise. Prefer to own property alone, but might take a mine to develop for a controlling interest.

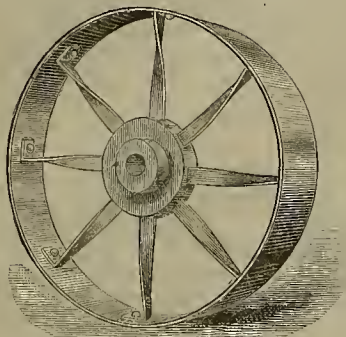
Address "WILSON,"
Care Mining and Scientific Press.

Iron and Machine Works.

MACBETH'S

—PATENT—

STEEL PULLEY.



Advantages of these Pulleys.
They are less than half the weight of cast-iron pulleys; are polished on the face; are made either crowned or straight, and are turned in the lathe the same as the best make of cast-iron pulleys.
They are carefully balanced. They are subject to no contraction strains, and can be run at very high speed without danger of bursting.
On account of their great lightness and the form of the arms, they absorb less power than any other pulley.
They are the only pulley of the kind which runs true. They cannot be broken in transport.

TESTIMONIAL:
MATHER LANE SPINNING Co. (Limited),
LEIGH, ENGLAND, Nov. 5, 1883.
N. Macbeth, Esq.—Dear Sir: The Patent Steel Pulleys supplied throughout to our No. 2 Mill are working to our entire satisfaction.
They are very true, and are about 50 per cent lighter than the cast-iron pulleys in our No. 1 mill.
Yours faithfully,
For the Mather Lane Spinning Co. (Limited),
[Signed:] RICHARD T. MARSH,
Managing Director.

Risdon Iron & Locomotive Works,
Sole Manufacturers and Agents for the
Pacific Coast,
S. E. Cor. Beale & Howard Sts., San Francisco.
Send for Circular and Prices.

UNION IRON WORKS,
SACRAMENTO, CAL.
ROOT, NEILSON & CO.,
MANUFACTURERS OF
STEAM ENGINES, BOILERS AND ALL
Kinds of Machinery for Mining Purposes.
Mining Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.
Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.
Manufacture Iron Castings and Machinery
of all Kinds at Greatly Reduced Rates.
STEVENSON'S PATENT
Mold-Board AMALGAMATORS,
Golden State Pressure Blowers.

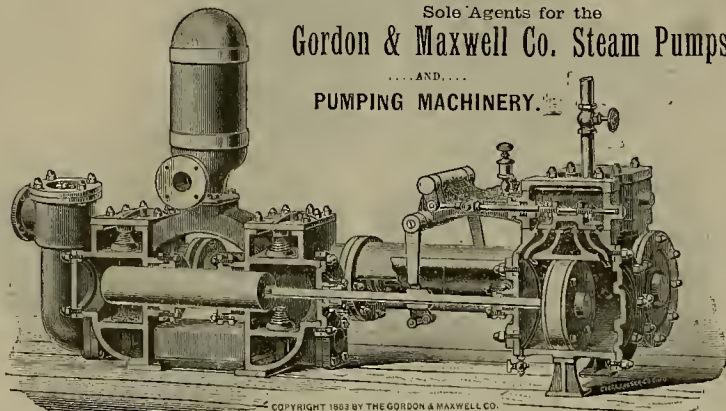
First St., between Howard & Folsom, S. F.
California Brass Foundry,
No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.
All kinds of Brass, Composition, Zinc, and Babbit Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Knibber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.
J. H. WEED. V. KINGWELL.

California Machine Works,
WM. H. BIRCH,
Engineer and Machinist,
119 Beale Street, San Francisco.
Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines,
Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.
Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

THOMAS THOMPSON. THORNTON THOMPSON.
THOMPSON BROTHERS,
EUREKA FOUNDRY,
159 and 131 Beale St., between Mission and Howard, S. F.
MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

COKE. PATENT. COKE.
This COKE is exclusively used by Prof. Thomas Price, in his assay office, by the Selby Smelting and Lead Co., Prescott, Scott & Co., Risdon Iron and Locomotive Works and others in this city. Large supplies are regularly forwarded to consumers in Salt Lake and Nevada, to the Copper Queen Mining Co., Longfellow Copper Mining Co. and other consumers in Arizona.
The undersigned are in receipt of regular supplies from Cardiff, Wales, and offer the COKE for sale in quantities to suit purchasers.
BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.

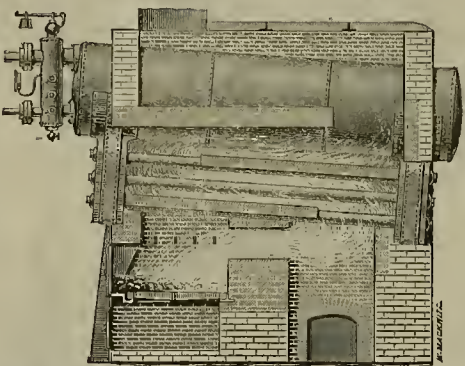
WHITNEY & MARSHALL, 22 & 24 FREMONT ST.,
SAN FRANCISCO, CAL.
Sole Agents for the
Gordon & Maxwell Co. Steam Pumps
PUMPING MACHINERY.



THE NILES TOOL WORKS,
E. GOULD & EBERHARDT,
MANUFACTURERS OF
IRONWORKING MACHINERY. WROUGHT IRON WATER & GAS PIPE
BUFFALO STEEL PRESSURE BLOWERS AND EXHAUST FANS.
DEALERS IN IRON, STEEL, METALS, AND MINING SUPPLIES.

HEINE PATENT SAFETY BOILER.
RISDON IRON AND LOCOMOTIVE WORKS,
Sole Agents for the Pacific Coast, Corner Beale and Howard Sts., San Francisco.

Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.
TESTIMONIALS.
ST. LOUIS, MO., Sept. 23, 1883.
Messrs. Adolphus Meier & Co. GENTLEMEN: We cheerfully certify that the "Heine Patent Safety Boiler" put up by you in our establishment has proved very satisfactory in its working. The chief points of excellence in the "Heine Safety Boiler" are its economy in fuel and space, freedom from scaling, adaptable for power and heating purposes, working equally well with clear and muddy water. We warmly recommend it to all using steam machinery. Yours truly,
ANTHEUSER BUSCH BREWING ASSN

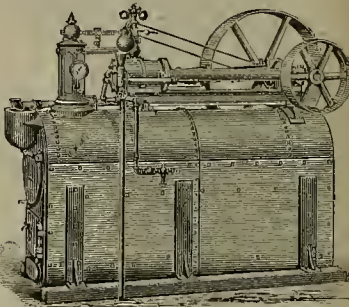


Office of Supt. of Royal Railways, Berlin, Sept. 23, 1883.
To Mr. H. Heine, Chief Engineer: In reply to your inquiry of September 21, we respectfully inform you that the three boilers built under your patents, under steam since September 25, 1881, at the Alexander Platz Depot, as well as the two at Friedrich Strasse Depot, under steam since September 22, 1882, have given good satisfaction, requiring no repairs whatsoever to date. The internal cleaning of the boiler was always accomplished with ease on account of the convenient arrangement of the tube caps, the adhesion of scales being fully prevented thereby, and the boilers kept in prime condition.
(Signed:) BRAUCKE.

Send for Circular and Prices.
F. P. BACON, PRESIDENT C. L. FOUTS, SECRETARY
THE GLOBE IRON WORKS COMPANY,
Manufacturers and Repairers of all Kinds of
Machinery and Iron Castings,
—AND BUILDERS OF—
LOCOMOTIVES, HOISTING and
MINING MACHINERY,
Portable, Stationary and Marine Engines
—MANUFACTURERS OF THE—
DYER CANNON BALL
QUARTZ MILL.
OFFICE AND WORKS:
Dyer Cannon Ball Quartz Mill. 222 & 224 Fremont Street, San Francisco, Cal.

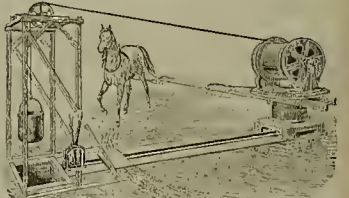
Mining Books.
Orders for Mining and Scientific Books in general will be supplied through this office at published rates.
L. PETERSON,
INVENTORS. MODEL MAKER,
258 Market St., N. E. Cor. Front, upstairs, S. F. Experimental machinery and all kind of models, tin, copper and brass work.

STEARNS MANUFACTURING CO
PACIFIC BRANCH:
21 and 23 Main Street, San Francisco.
...BUILDERS OF...
HEAVY CIRCULAR SAWMILLS,
Iron Gangs,
Pacific Screw Fractional and Self-Receding
32d Fractional Head Blocks,
GANG EDGERS, LIVE ROLLS,
Automatic and Slide-Valve Engines,
STATIONARY AND PORTABLE BOILERS
...AND...
General Sawmill Machinery.



SOLE AGENTS FOR THE
Skinner & Wood Celebrated Portable,
Mounted and Detached
Engines and Boilers,
5 to 25 Horse Power.
Unequalled for Simplicity, Safety and Effective Steam-
ing qualities. SEND FOR CATALOGUE.

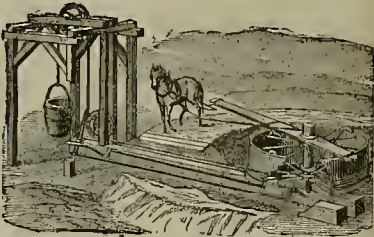
BAKER'S MINING HORSE POWER.



THE MOST EFFICIENT AND PRACTICAL MACHINE
ever invented for the service of Prospectors and
others requiring the use of a Horse Power, possessing
all the requirements of a first-class hoist and affording means
for the continuous operation of a Pump or Blower without
interfering with a hoisting apparatus.
It is made entirely of iron; no piece weighs
over 250 pounds. At the ordinary speed of a horse a
1,000-pound bucket of ore may be raised 120 feet per
minute. The hoisting drum is under the complete control
of the man at the shaft, and is capable of carrying 500
feet of five-eighths steel rope. The cost of erection is
slight, as two men in half a day can easily put it in place
ready for work.
While this power is more particularly for mining pur-
poses, it is equally adapted to all other uses where animal
power is required. SEND FOR CIRCULAR.
Address

PACIFIC IRON WORKS,
Rankin, Brayton & Co.,
SAN FRANCISCO - AND - CHICAGO

MINERS' HORSE WHIM.



ONE HORSE CAN EASILY HOIST OVER 1,000 LBS.
at a depth of 500 feet. The Whim is mainly built of
wrought iron. The hoisting drum is thrown out of gear
by the lever, while the load is held in place with a brake
by the man tending the bucket. The standard of the
whim is bolted to bed-timbers, thus avoiding all frame-
work. When required, these whims are made in sections
to pack on mules.
120 in Actual Use.
EDWARD A. RIX,
MANUFACTURER,
18 and 20 Fremont St., - San Francisco

San Francisco Pioneer Screen Works.
J. W. QUICK, MANUFACTURER.
Several first premiums received
for Quartz Mill Screens, and Per-
forated Sheet Metals of every
description. I would call special
attention to my SLOT CUT and
SLAT PUNCHING SCREENS,
which are attracting much at-
tention and giving universal satis-
faction. This is the only estab-
lishment on the Coast devoted
exclusively to the manufacture of
Screens. Mill owners using Battery Screens extensively can
contract for large supplies at favorable rates. Orders solicited
and promptly attended to.
32 Fremont Street, San Francisco.

NATIONAL COMPRESSORS and ROCK DRILLS.

EDWARD A. RIX, Agent,

18 and 20 Fremont St., - San Francisco.

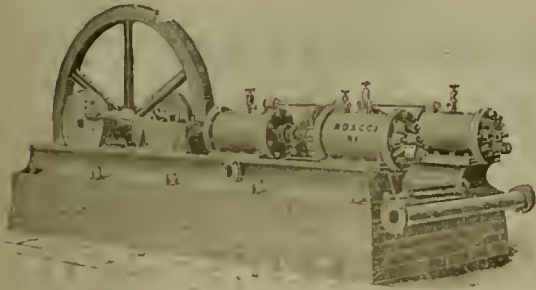
ON SEPTEMBER 1, 1883, I RECEIVED

THE LATEST IMPROVED NATIONAL DRILL,

— WHICH —

Anyone, upon examining, will proclaim to be far superior to anything yet offered to the MINING PUBLIC in the shape of a ROCK DRILL.

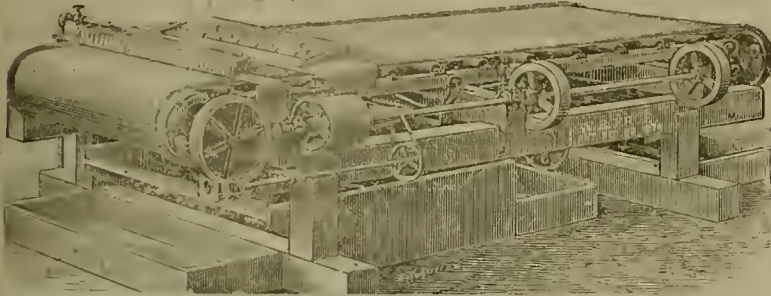
CALL AND SEE IT OR SEND FOR CIRCULARS.



\$1,000 CHALLENGE!

PRICE REDUCED,

Jan. 1, 1884, to FIVE HUNDRED and SEVENTY-FIVE DOLLARS (\$575.00).



OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the office of Hinchley, Spiers & Hayes, No. 220 Fremont Street, San Francisco.

To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.

Room 7—No. 109 California Street, - - - - - SAN FRANCISCO, CAL.
January 3, 1884.

THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.

PACIFIC MACHINERY DEPOT.

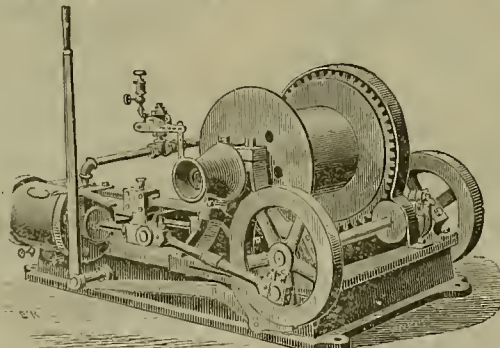
H. P. GREGORY & CO.,

Importers and Dealers in Machinery and Supplies.

Nos. 2 and 4 California Street, S. F.

SOLE AGENTS FOR

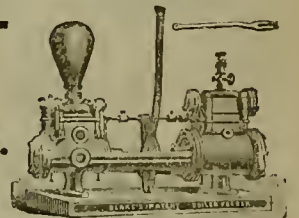
J. A. Fay & Co., Wood Working Machinery.
Bement & Son's Machinists Tools.
Blake's Steam Pumps.
Perry's Centrifugal Pumps.
Gould's Hand & Power Pumps
Perrin's Band Saw Blades.
Payne's Vertical and Horizontal Steam Engines.
Williamson Bros. Hoisting Engines.
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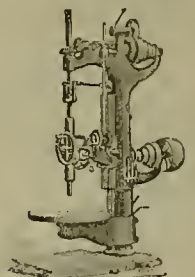
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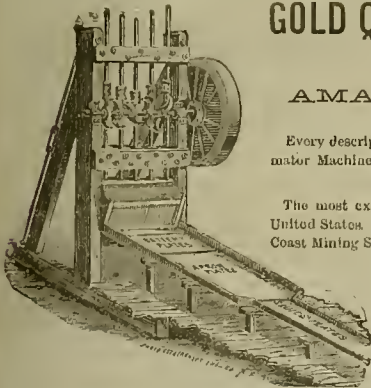
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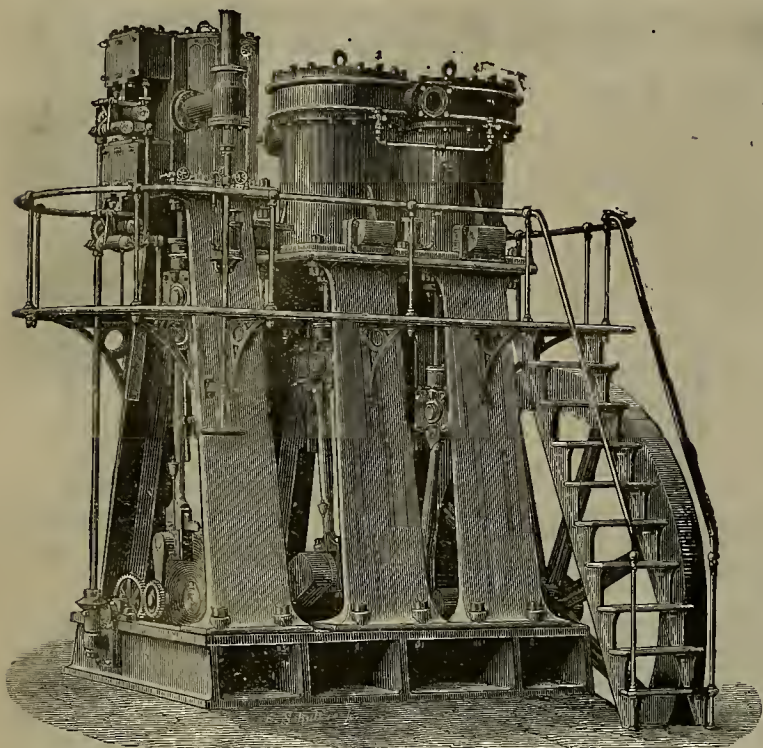
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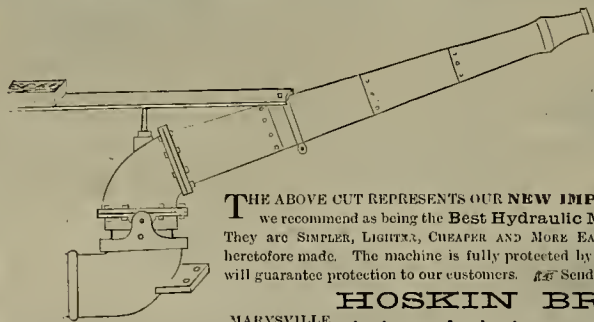
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SAN FRANCISCO, SATURDAY, MARCH 29, 1884.

VOLUME XLVIII
Number 13.

Examination of Hoisting Gear.

There is very little doubt that many of the accidents which occur from the breakage of wire ropes or hoisting gear of mines could be prevented if any regular systematic inspection took place. This is apt to be omitted or to be only attended to by subordinates, who may know more about trundling a wheelbarrow or dumping a car than the examination of wire rope. Another thing not always thought of is that the rope may be examined too frequently. This may appear like a strange objection, but daily routine work often becomes mere routine, and the man whose duty it is to inspect may think more of ridding himself of an irksome and frequently recurring task than of the actual results to be accomplished. To take the case of the hoisting rope: The person whose duty it is to examine it stands and looks at it as it is being rapidly let down or drawn up, and then signs a report declaring it to be in a sound condition. This person is perfectly aware that a serious defect might, and almost certainly would, escape his observation under such circumstances. But a sufficient inspection would occupy a good deal of time, and this consideration leads him to evade it. The same thing takes place with other machinery. The mischief is that this so-called examination prevents a real examination from being made at more distant intervals when sufficient time could be devoted to it. Hence defects remain unobserved, and sooner or later an accident happens. Daily inspection, therefore, is apt to be more a source of danger than tending to security.

But at least once a week the machinery, rope and all hoisting appliances, should be inspected carefully by a perfectly competent person who is not the one in daily charge of it. With a daily inspection there is a tendency to believe that nothing could have happened in the short intervals since the last examination, and a careless perfunctory overlooking of the rope is the result. But the consciousness that seven days have elapsed since it was last examined awakens an anxious desire to know accurately its present state. The galleys frame, shieves, ropes, gears, cages, guides, safety clutches, springs, brakes, and all of the appliances that go to make up perfect hoisting works, should be carefully and systematically examined at least once a week. This will take a little time of course, but this should not be grudged, as the safety of so many lives depends upon this gear. Of late years we have not had so many accidents with this part of the mining outfit as formerly. All the machinery and appliances, however, may be of the very best character, but they more or less want systematic periodical examination and care.

A new organization, known as the Young Men's Scientific Society, has elected the following officers: President, Milton S. Eisner; Vice President, George Nuttall; Secretary, Benjamin Ariner; Financial Secretary, C. G. Levi-son; Treasurer, Gus Brenner; Directors, M. Feintuch, H. C. Badger, H. W. Faust, J. W. Wolf. The society will give its first public lecture in about two weeks.

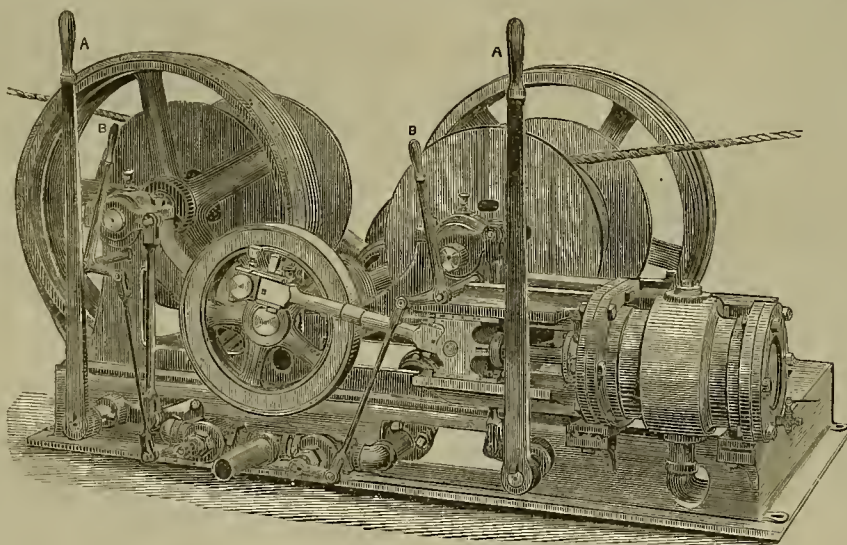
Snow is so deep on one branch of the Canada Pacific that no trains have passed for 18 days.

Nuggets.

It is not by any means an uncommon occurrence, in some of the mountain towns of California, for people to find small gold nuggets on the hillsides and in the gulches after heavy rains. If this was done once in a while in a distant country which we knew little of, we should read of it with wonder, and consider it a very desirable place of residence. Being at home, however, and near by, we pay little attention to such matters. In Mariposa county, for instance, over a thousand dollars in nuggets has been picked up since the last rain. The Mariposa Gazette of last week mentions the following instances:

The late storm has brought to the surface several gold specimens, which have been picked up and reported:

John Ellen picked up a piece of rock near Elkhorn ranch, supposed to contain at least \$1,000, which he sold for \$500. He was doing



WILLIAMSON'S DOUBLE DRUM FRICTIONAL HOISTING ENGINE.

some prospecting, since the rain, in the vicinity of the Brooks mine, about four miles north-easterly of the town of Hornitos. As prospectors are in the habit of doing, he, with his pick, was just turning over the scattered boulders and float quartz rock that lies upon the surface, when he caught the glimmer of gold sticking out from a small boulder, which weighed 20 pounds.

George Gordon picked up a specimen near town worth \$45.

Mr. C. V. Dingley, over on Mono, about five miles northeast of town, picked up a solid piece valued at \$100.

Raphael Farrias found a specimen worth \$44.

About \$150 was picked up in the streets of Hornitos, by different parties, some two weeks ago.

If these circumstances had been recorded of the Oeur d'Alene region, or of Alaska, people would have opened their eyes in wonderment. Of course such things do not occur every day, but that they happen at all will surprise some who think that California is a played-out mining country.

ALBERT ARENTS has been appointed Superintendent of the Mount Cory mine in place of Alex. G. McKenzie, deceased.

Improved Hoisting Engine.

The accompanying engraving shows the Williamson patent horizontal, double-drum, frictional-gear, hoisting engine. These double-drum friction hoists are made horizontal or inclined. Each drum is worked entirely independent of the other, having a steam pipe and valve connection to the engine separate from each other, so that when one is hoisting the other can be lowering, or one can remain stationary while the other is in motion. The engine is always running ahead, and each drum is operated entirely by one lever, which, at the same time the load is thrown on the brake, shuts off the steam for that drum, whilst the governor valve for the other drum remains unaltered. When both drums are thrown on at the brake, and are stopped or lowered at the same time, steam sufficient to keep the engine in motion is allowed to enter the cylinder through the starting valve. In the en-

graving A is the operating lever which throws the friction gear into or out of contact, releases or applies the brake, and opens or closes the governor valve. B is the throttle valve. After the lever B is set to suit the load, it is unnecessary to handle any other than the lever A for hoisting, stopping and lowering.

Several forms of these hoisting engines are made, with spur or friction gear. One engine is specially designed for steamships; another is made for prospecting purposes at mines, or for use on wharves, etc. They are made stationary or portable. The Williamson Brothers, of Philadelphia, manufacture these hoisting engines, and H. P. Gregory & Co., of this city, are sole agents for this coast.

A PETITION is being circulated at Cherokee entreats the Board of Supervisors to grant an appropriation from the General Fund or any other fund of the county of Nevada to aid the defendants in the Woodruff case, to assist in defraying the expenses of taking an appeal from the decision and decree of Judge Sawyer. The amount prayed for is \$5,000.

QUIRK, the defaulting wharfinger, has been sentenced to three years' imprisonment at San Quentin.

A Curious Mine.

There is at Sunny Corner, new South Wales, a mine that has been mined for gold for twenty years past, and has been the fortune of two or three men. The ore has been run through a five-stamp mill, and has yielded from half an ounce to twenty ounces of gold to the ton. By good fortune the water supply was short, and they had to settle all their tailings in tanks so as to save the tailings so as to save the water. They now find themselves in possession of a pile of tailings estimated as containing from 15,000 to 20,000 tons, and from many different assays made in the last year each ton will contain from 40 to 70 ounces of silver and from 5 to 7½ per cent lead.

An old California mining man, who is now managing the mine, writes to a friend in this city a letter describing the curious geological features of the mine. It is a flat lode. Above the crushing ore, which is a decomposed quartz, with some iron in it, is a pipe clay, spotted with small crystals of pyrites.

The crushing ore is from a few inches to four or five feet thick; then comes in some places a light red gossan iron ore, and below that a hard, flinty rock, that they never have gone through. In places a heavy lead ore is found between the gossan and the crushing stuff. It seems to run in channels, and sometimes will entirely disappear in a few feet. Since our California friend has been at the mine he has had the gossan assayed, and there is silver and lead in all of it, although to look at it no one could see any sign of either lead or silver ore.

In one place they sunk through the gossan and came on a galena lode. It is 24 feet wide, but is not very good, as it only gives about 18 per cent lead and 15 ounces silver. It contains a good deal of zinc and iron, and also some copper. When in the winze lately the Manager noticed the lode was all covered with little blue crystals of sulphate of copper. The water running out from the mine leaves thick coatings of metallic copper on the iron rails if they are immersed a short time. Several geologists and mineralogists of note have examined the mine, and they all say it is a very queer specimen of a mine. The gossan being under the ore makes our California friend believe that it has been turned upside down.

A COLORADO LOCATION.—A prospector who struck a lead in the Gunnison country not long ago, posted the following notice: "The undersigned claims this lode with all its drifts, spurs, angles, sinosities, etc., etc., from this stake a 100 feet in each direction, the same being a silver-bearing lode, and warning is hereby given to all persons to keep away at their peril. Any person found trespassing on this claim will be persecuted to the full extent of the law. This is no monkey tale butt I will assert my rites at the pint of of the sick shuter if legally Necessary so talk head and good warnin. Accordin to law I post This Notiss.—JOHN SEARLE."

JOHN EVANS was killed last Monday night at the Mount Diablo mine, in Candelaria, by the premature explosion of a blast. He was foreman of the Northern Belle until the mine closed down.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Hawthorne.

The Neighboring Mining Districts.

[From our Traveling Correspondent.]

EDITORS PRESS:—Hawthorne is a two-year-old town at the head of Walker Lake, Esmeraldo county, Nev., on the Carson and Colorado railroad, about 150 miles from Carson City; is the county seat of Esmeraldo county.

The platting and building a town at this point seems well advised. The view of the distant mountains with all their varied crownings, gorges and irregular bases and declivities presents a border to the extensive plains that surround Hawthorne, at once grand and pleasing to the visitor. The gentle slope of the open plain to the east looks on the bright, clear surface of Walker Lake with its clean gravelly beach, the delight of the bathers in the hot summer season. The lake seems to a stranger scarcely a mile off, when he is informed that it is 3½ miles; the atmosphere is so clear that distant objects seem very near.

Hawthorne is named after W. A. Hawthorne, now an acting Judge in this place, and highly esteemed citizen. The population is now about 1000; is well supplied with stores and machine shops, and is largely drawn on for supplies for all the various districts that radiate from this as a common center in every direction.

West of Hawthorne eight miles is the

Walker Lake Mining District.

Where the Emerald Mining and Commercial Company have a group of ten mines in one solid, unbroken hill, some of which claims they have partially developed, showing free milling gold ore with a small amount of silver. The Bull of Woods, now called the Morning Star, has two drifts each over 100 feet long where they strike good ore ledge 2½ feet thick, giving average assays from wall to wall of \$45 in gold, worth \$15 per ounce.

The prospect ore taken out was worked in the company's own mill in quite a satisfactory manner, yielding about \$2,000. They were employing twelve men on eight-hour shifts driving on the tunnels on the vein to open up stopings preparatory to starting up the mill for steady running. Expected to have a length of 250 feet in each drift on the ledge by March 1st—making stopings of 200 feet depth from the surface. This whole group of mines can be tapped at a depth of 2,500 feet by a tunnel 2,500 feet in length, and thus discharge the ore where wood and water are plenty and of easy access from the open valley below. The principal owners of this property are Messrs. Knapp and Laws, Forbes and Tohey and W. A. Hawthorne, all of Hawthorne.

The next to the southwest are the Corey and Big Indian mine.

The Powell Creek mines are also giving good reports of free gold ores, and still higher up on the mountain yielding also silver ores. The Alum Creek mines are spoken of as very promising prospects, all yet in the hands of poor men. Whisky Flat, off to south of Hawthorne about 14 miles, has considerable development work. One vein of 5 feet thickness gives rich silver ore that they have shipped away and got net \$600 per ton after paying shipping and milling expenses. The Prince mine, in the same district, is looking well and giving good ores, assaying \$1200 per ton. Still south of that are the Perrington copper mines, 20 miles from Hawthorne, showing extensive mines, and very favorable indications for a rich camp.

Passing still further around in the circuit to the east of Hawthorne 16 miles, we are in

Garfield District.

Where Farrington and Moss with many other locations, are proud of their rich surface outcroppings. The Farrington and Moss are down about 500 feet with large bodies of ore that will yield from \$100 to \$300 per ton, from which they have milled several hundreds of thousands of dollars. Some was sent to Belleville and to other mills, leaving large amounts of second-grade ore on the dumps. Then on a little more eastward is the Santa Fe district, lying about 30 miles from Hawthorne—a large district, and known to contain some good ore in different mines. There is much room yet here for prospecting.

"Gillis Mountain and Dry Hill."

On to the northeast, and about the same distance as this district, is the Gillis mountain and Dry Hill country, extending around to the east side of Walker Lake.

The Gillis has been taking out and shipping away a considerable of high grade ore. The Moss and McDonald mines in the Dry Hill range, are reported rich in free milling ores. There are many other suburb or tributary camps lying around Hawthorne that as yet are scarcely touched by the prospector, and yet give evidence of being mineral grounds and must soon prove tributary to this common center and depot for this whole region.

The town is growing steadily. The best building is the brick court house. They are erecting a public school edifice. There are three grocery and general merchandise stores, several general variety stores, one dry goods store, one drug store and a full supply of saloons, restaurants, and hotels. All these institutions and the city father's are under the careful and

fatherly criticism of two ably conducted newspapers, ready to issue an extra to announce any important item of information. Such is Hawthorne and a small portion of its tributaries with the great bonanza. Mt. Cory mines purposely left out, as worthy of a separate mention. Hawthorne is surrounded by 50,000 acres of valley land, which may prove valuable if any successful means of irrigation are discovered.

B. W. CROWELL.

Precipitation of Gold.

EDITORS PRESS:—"From a practical point of view certainly none," in reference to a proposed method of obtaining "pure gold," or I will say, nearly pure gold, at once, in place of a mixture of gold sulphide with copper sulphide, is language on which comment would be thrown away; and I would like to ask if the ignorance of the writer of the article referred to (MINING AND SCIENTIFIC PRESS, March 1st) in regard to the precipitation of gold by copper sulphide, is a valid reason for the rejection of such a process without trial. The method is "bazaarous" in the estimation of that writer, simply because he does not know whether it would work or not. Why should he not inform himself before condemning? It would not be a very difficult matter for a person making the experiment to ascertain whether the decomposition was complete or otherwise; or, which is the main point, whether any gold remained in the solution or not.

The saturation and "considerable excess" plan would prevent the use of hydrogen sulphide except with liquids free from copper "even in small quantities," while my plan, if successful, would enable its use in the presence of any quantity of copper.

Again, I would ask: In what way does the presence of free chlorine interfere with the use of iron protosalts as precipitants, beyond causing an increased consumption of those? It converts them into persalts—so does gold telluride. The chemists—or some of them—tell us that iron persalts can dissolve gold, but I have found, by experiment, that they don't dissolve a perceptible quantity of it in the presence of an excess of the protosalt.

Nitric acid is so unusual a constituent of the leach that it may be passed over, but as to the "series of terchlorides and hypochlorites" which may cause an incomplete precipitation, the question in which we are interested is, do they? Or, is it another case of "not ascertained" (by the writer in question)?

C. H. AARON.

Reduction Works in New Mexico.

The Review publishes the following valuable summary of the condition of mining plants in New Mexico:

There are in the Territory 46 plants and reduction works. Forty-five of these have abundance of available ore right at hand, but 37 are not in operation. Cause: Mismanagement, lack of funds or corporative manipulation. The Hub's smelter at Albuquerque is the only one in the Territory that has not pay right at its door. In no other instance is the cause of idleness to be attributed to the want of ore. This being a fact, isn't it a rather sad commentary on the mining interests of New Mexico that so much valuable machinery should continue to lie idle? Mismanagement and lack of capital are partially responsible, as before stated, but stock jobbers and mining sharks have a great deal to answer for in the matter—it isn't the work of the miners! The list is as follows:

- *+* One 10-stamp mill at Elizabethtown.
- *+* One 30-ton smelter at Los Cerrillos.
- *+* One 10-stamp mill at Golden.
- *+* Two 30-ton copper smelters at San Pedro.
- *+* Two reverberatory furnaces at San Pedro.
- *+* One 40-ton water-jacket smelter at Santa Fe.
- *+* One 30-ton copper smelter at Nacaminto.
- *+* One 30-ton smelter at Albuquerque.
- *+* One 10-stamp mill at Socorro.
- *+* Two 30-ton water-jacket furnaces at Socorro.
- *+* Three 80-ton furnaces at Socorro.
- *+* One 30-ton smelter at Magdalena.
- *+* One 25-ton smelter at Fairview.
- *+* One 60-ton concentrator at Chlorido.
- *+* One 10-stamp gold mill at Negai.
- *+* Two 10-stamp gold mills at Hillsboro.
- *+* One 30-ton lead smelter at Organ.
- *+* One 30-ton copper smelter at Organ.
- *+* Two 10-stamp mills at White Oaks.
- *+* One 30-ton smelter at Deming.
- *+* One 30-ton sampler at Lake valley.
- *+* One 60-ton smelter at Lake valley.
- *+* Two 20-stamp mill at Lake valley.
- *+* One 30-ton smelter at Kingston.
- *+* One 10-stamp mill at Georgetown.
- *+* One 10-stamp mill at Mimbre.
- *+* One 20-stamp mill at Santa Rita.
- *+* One 30-ton smelter at Santa Rita.
- *+* One 20-ton galena smelter at Ivanhoe.
- *+* One 20-ton copper smelter at San Jose.
- *+* Two 10-stamp mills at Silver City.
- *+* One 20-stamp mill at Steeple Rock.
- *+* One 20-stamp mill at Shakespear.
- *+* One 30-ton smelter at Hachita.
- *+* One 30-ton copper smelter at Burro Mountain.
- *+* One 20-ton concentrator at Kingston.
- *+* Two reverberatory furnaces at Burro Mountain.

- * Indications not running.
- † No money to carry on business.
- ‡ Pay ore available.

Up around Columbus they have some lovely and quite suggestive names for borax works. There is the Tenderfoot, the Lovely Pill, the Red Head, the Bellyache, and so on ad nauseum.

The Volumetric Determination of Manganese.

The following paper by J. B. Mackintosh, E. M., New York City, was read at a meeting of the American Institute of Mining Engineers:

In a recent paper read before the Institute on this subject, Mr. G. C. Stone advances the theory that the precipitate obtained in Williams's volumetric process, by heating the boiling nitric acid solution of a manganese salt with potassic chlorate, is not pure, MnO_2 , but approximates more closely to the composition, $10MnO_2 + MnO$.

As the value of the process and the accuracy of our results would depend on whether this was the fact or not, it has seemed to me, and to my associates, Messrs. Beebe and Colley, that it would be of importance to ascertain the composition of this precipitate, and to that end the following series of experiments has been undertaken: These experiments have all been based on the considerations:

1. That potassic permanganate has an oxidizing power equivalent to five atoms of oxygen for every two of manganese: $K_2Mn_2O_8 = K_2O.2MnO.O_5$.

2. That the same amount of manganese, in the state of binoxide, has an oxidizing power equivalent to two atoms of oxygen: $2MnO_2 = 2MnO.O_2$.

If, then, we take a solution of permanganate of unknown strength, and reduce it to binoxide, the oxidizing power of the binoxide formed will be equal to that of two-fifths the quantity of the p-manganate solution originally taken. While, if the precipitate obtained should not be binoxide, but an indefinite or definite mixture of bin- and mon-oxides, then, from its equivalent oxidizing power, we can calculate its composition.

The analyses were conducted in the following manner: The amount of permanganate taken was decomposed with hydrochloric acid, and concentrated to expel the excess of water. Sufficient excess of nitric acid was now added, and the solution was boiled until all the hydrochloric acid was destroyed. The manganese was then precipitated by potassic chlorate; and, after standing some time to cool—a precaution which we consider of importance—the precipitate was filtered out through asbestos, washed with nitric acid and then with water; and, when perfectly clean, was treated with a volume of oxalic acid, whose equivalent in permanganate was known, a few cubic centimeters of sulphuric acid being also added. The excess of oxalic acid was then estimated by permanganate, and the difference between this amount and the equivalent of the whole amount of oxalic taken gave the oxidizing power of the precipitate.

To save multiplication of figures we will only give the results obtained:

$K_2Mn_2O_8$ used.	Oxidizing power of precipitate in terms of $K_2Mn_2O_8$.	Theoretical for MnO_2 .	Apparent per cent. of theoretical.	Corrected per cent. for burette error.
c.c.	c.c.	c.c.		
45	17.50	18	98.89	99.37
35	13.93	14	99.50	100.07
25	9.90	10	99.00	99.85
15	5.96	6	99.33	100.67

Average true per cent., 99.99.

The precipitation in the above results was effected by successive alternate additions of potassic chlorate and nitric acid, until no further formation of yellow fumes was observed. Shortly after first employing the method, we noticed that the reaction was seldom complete when potassic chlorate was added during one period only; and that if, after the apparent completion of the reaction, as marked by the explosive cessation of yellow fumes, more nitric acid was added, and then a fresh portion of potassic chlorate, that the yellow fumes would reappear, again to disappear with the characteristic puff. On this account it is necessary, in employing this method, to add alternate amounts of nitric acid and potassic chlorate, until no further effect is produced; and, if this precaution is not observed, the results will almost invariably be low.

The next series of experiments was made to illustrate this point, and to determine the amount of error which would be incurred by exactly following the directions given by Messrs. Ford and Williams in their respective papers, namely, by adding potassic chlorate during one period only, and boiling till the apparent cessation of the reaction. The results obtained were as follows:

$K_2Mn_2O_8$ used.	Oxidizing power of precipitate in terms of $K_2Mn_2O_8$.	Theoretical for MnO_2 .	Apparent per cent. of theoretical.	Corrected per cent. for burette error.
c.c.	c.c.	c.c.		
40	15.55	16	97.20	97.32
45	17.70	18	98.33	98.92
60	23.37	24	97.40	98.04

Showing an error of from one to two per cent. The following determinations were made about last February, but no particular record

of the details of the manipulation were preserved:

25	9.93	10	99.30	98.34
50	19.73	20	98.65	99.07

It is evident, from inspection of these results, that the first set approach very nearly to the theoretical figure for MnO_2 , the average of the four happening to be 99.99 per cent. This close agreement with the theory must, however be considered as largely accidental, as the variation in the separate determinations is quite large. In a process of this kind we must consider that the experimental errors are relatively large; indeed, larger than in the actual application of the method to analysis. These experimental errors, doubtless, balance each other to a large extent by averaging several results, as in the present instance; but we can hardly expect to get such close average results every time.

The burette was calibrated for each analysis by weighing the amount of water delivered corresponding to the various volumes used, and making proportional corrections.

Now, if the composition of the precipitate had been $10MnO_2 + MnO$, as claimed by Mr. Stone, the oxidizing power found should have averaged 90.91 per cent of the theoretical figure for MnO_2 , instead of that which we have actually found; so that the difference is far too great to admit of any doubt as to the true composition of the precipitate. We may safely conclude, then, that the precipitate obtained in this process, when due regard is paid to the precautions which we have indicated, is MnO_2 , and not an indefinite or definite mixture of oxides, that the process is reasonably accurate, and that any estimation based upon the theory that the precipitate is not MnO_2 is of no value, because it is founded on false premises, and therefore can never be true save by accident.

Consolidating Mining Locations.

In the case of the St. Louis Smelting and Refining Co. vs. Kemp and Nuttall, on appeal from the U. S. Circuit Court of Colorado, the U. S. Supreme Court recently rendered a very important decision relative to the consolidation of mining locations and making the annual expenditure required by law for each and all of such locations upon one shaft or tunnel. The opinion of the Court was written by Justice Field of this State, and is very liberal toward the working miner. A broad distinction is made between a "location" and a "claim," a location being held to be that quantity of mining ground which one person may legally acquire by location in one body (i. e., 1500x600 feet, or less), while a claim may embrace a dozen such locations acquired by purchase, provided they be contiguous—and the annual expenditure required for each of the dozen locations so embraced in such claim may be made upon any portion of the claim, "when such labor is performed or improvements are made for its development; that is, to facilitate the extraction of the metals it may contain, though in fact such labor and improvements may be on ground which originally constituted one of the locations, as in sinking a shaft, or be at a distance from the claim itself, as where the labor is performed for the turning of a stream, or the introduction of water, or where the improvements consist in the construction of a flume to carry off the debris or waste material." This is the language of the Court; and it further says that "it would be absurd to require a shaft to be sunk on each location in a consolidated claim, when one shaft would suffice for all the locations." By the provisions of section 2330 of the Revised Statutes of the United States, two or more persons, or associations of persons, having contiguous claims of any size, are allowed to make a joint entry thereof, and in the decision from which we quote the Court says that "no motive can be imagined for allowing two or more persons to unite their entries in one survey which does not apply with at least as much force for allowing a single person to unite his entries adjoining each other in one survey."

DRY GOLD WASHER.—In the rear of A. Weill's store may be seen a dry-washer, or a machine to separate gold from the dirt, sand or gravel in placer diggings that are destitute of water. Since the gold era commenced a great many machines have been invented for this purpose, but none of them have been used to any great extent, and probably one equal to all requirements was never made. The one under notice, however, impresses everybody favorably. The construction is simple and easily understood, and it is impossible to see any reason why it will not fulfill the purpose of its construction perfectly. But this is not a matter in doubt, as it is said to have been thoroughly tested. The inventor, a German now living in this vicinity, used one made after the same model, last summer, in Lower California, and it worked to the admiration of all who saw it, while the one here has been tried on the gold-bearing gravel of the bluffs, and found to do all claimed for it by the inventor. It works by hand-power, and turns as easily as a fanning mill. It is claimed that with the work of five men it will separate the gold from fifty tons of dirt or gravel per day. It is well worth examination by all who take an interest in mining. There are dry diggings in this county where this machine might be profitably used.—*Bakersfield Californian*.

MECHANICAL PROGRESS.

Producing Compound Plates by Welding.

In compound plates as heretofore manufactured from layers of hard and soft steel and iron, while uniting the hard material with the soft, and in the further manufacture of the plates when in a heated condition, a considerable proportion of the carbon passes from the hard to the soft layers. The object of manufacturing compound plates is thus to a great extent frustrated; furthermore, difficulties arise in the manufacture, because, according to conditions of temperature, more or less carbon passes into the soft layers, so that in many cases the requirements as to the amount of carbon to be contained in the plates are not obtained. To overcome this difficulty Mr. F. A. Krupp, of Essen, welds between the hard layers and soft layers of compound plates a thin layer of such metal or metallic alloy as will prevent or, at any rate, much impede the passing of carbon from the harder into the softer layer. Such or suitable metals and alloys of metals as will, on the one hand, much impede the passing of the carbon, whilst, on the other hand, will readily become welded to iron or steel or to chilled cast iron, are, for instance, nickel, cobalt, and highly silicious iron. He uses by preference sheets or plates of nickel welded on both sides to sheets of iron, and he thereby attains his object with a comparatively thin layer of nickel. The invention is applicable not only to compound plates, but also to other articles which are composed of hard and soft kinds of steel and iron, and may be applied in various ways. As a rule, however, the conditions of temperature of the layers to be combined with one another must be so chosen that the intermediate layer is welded with the iron and steel, but is nevertheless not melted.

The simplest method of making such a plate is to make the intermediate plate as if it were a partition in mold or form into which hard steel is poured at one side of the intermediate plate, whilst mild steel or homogeneous iron is poured in simultaneously at the other side. If it is desired to avoid the pouring in of hard and soft metal at the same time, then one material is first poured against one side of the intermediate plate, which is firmly fixed against the wall of the mold. The casting having congealed or set sufficiently, and being of a suitable temperature, is then placed in another mold, and the other material is then poured against the other side of the intermediate plate. If, for instance, the compound plate is to consist of annealed or puddled iron and cast steel, then the welded plate, when it has been welded for the last time, has for its inside last layer welded to it, for example, a sheet of nickel, having welded on both its sides sheets of iron, and then casting on the other side of the welded plate a layer of steel in any convenient manner. Or the intermediate plate may be of highly silicious iron. The manner in which the process or invention must be modified, when the plates to be manufactured are to consist of several alternate layers of hard and soft material, is obvious.—*The London Mining Journal*.

NEW PROCESS FOR HARDENING WROUGHT IRON. The Marquette (Lake Superior) *Mining Journal* has recently witnessed some practical experiments with a new method for giving a hard steel surface to ordinary iron by a process which that paper characterizes as "at once simple, cheap and inexpensive." The experiments are described as follows: "The inventor took a piece of ordinary rod iron, heated and dressed it into shape as a cold chisel. It was then sharpened in the usual way, when it was subjected to treatment by the new process, which is, it is almost unnecessary to add, a secret with the person who discovered it. In a few minutes it was given to the newspaper delegate to experiment with, when he found the edge surface so hardened that it would actually cut glass like a diamond. A file that was tried upon it came out of the encounter bereft of its teeth. Nothing that the reporter could find then or since—not even the most powerful acids—can affect the wonderful surface and edge produced by the process, whatever it is. At the same time the parts not treated remain as before, ordinary iron, and nothing more, upon which a jack knife is capable of making a well-defined impression. The cold chisel thus made lies on the editorial desk as we pen this, and a badly scratched window pane just opposite bears evidence of the superior hardness of the tool. The invention is a valuable one for a thousand uses. Mr. M. L. Hayley, the inventor, is a practical worker in iron, and feels confident that his process will come into general use for a multitude of purposes as soon as its utility comes to be generally understood."

NATURAL GAS IN THE PRODUCTION OF IRON. At the late Cincinnati meeting of American Institute of Mining Engineers, Capt. Wm. R. Jones made an interesting statement in regard to the use of natural gas at the Edgar Thomson Steel Works. Captain Jones stated that natural gas was destined to play an important part in the economies of production at the works near Pittsburgh. The Edgar Thomson Steel Works own a gas well at Murfreesville, some 12 miles from their mill. From this well an 18-inch pipe is laid to the works. At the well the

pressure is about 120 pounds to the square inch, which is reduced in transmission to about 60 at the works. The gas is used in the boilers, of which there are 48. Some 15 to 16 volumes of air are required to properly consume 1 volume of gas. At first the gas was conveyed through a 2-inch pipe, to which a reducer was attached, to weaken the pressure direct to the boilers, but this was dangerous, creating a liability to explosion. The plan now is to have the gas in checker-work. Its use at these boilers has enabled them to dispense with 82 men. He had also used the gas in the carbonization of spiegel in the ladle, blowing it into the bottom of the molten metal.

Influence of Cement Mortar on Lead Pipes.

A late number of *Metallarbeiter* illustrates the peculiarities exhibited by leaden pipes which had been imbedded for five years in a layer of Portland cement. A red coating was noticed from 1-24th to 1-8th of an inch in thickness, the appearance of which corresponded with that of oxide of lead as it is usually delivered in commerce. This coating was carefully removed, and the particles of lead removed with it were separated by means of a magnifying glass. The specific gravity of this powder (carefully defined at 59 F. and reduced for a vacuum) varied between 8.002 and 9.670. This variation is explained by the presence of metallic lead mixed in the oxide of lead, and carbonate of lead. Qualitative analysis demonstrated that this powder contained oxide of lead, lead, carbonic acid, water and traces of calcium. The composition of the powder was as follows:

Oxide of lead.....	84.89
Lead.....	12.33
Water.....	0.99
Carbonic acid.....	1.53
Lime.....	Traces.
Insoluble in nitric acid.....	0.16

This coating on the lead pipe appears to have been formed by the action of the oxygen in the air in union with that of the lime contained in the mortar. It is remarkable that the action of lime water on lead has also been noticed by Besnoot.

TREATING RHEA FIBER. A prize of five thousand pounds was offered by the Indian government for the best machine for the treatment of rhea fiber. In 1869, a Mr. Greig of Edinburgh made a machine for this purpose; but it did not fulfill the conditions laid down, so the full prize was not awarded. Another competition took place, but was unsuccessful. Some rhea fiber experimented on in 1852 by Dr. Forbes Royle was in strength, as compared with St. Petersburg hemp, in the ratio of 280 to 160, while the wild rhea from Assam was as high as 343. Rhea has the widest range of possible applications of any fiber, as shown by an exhaustive report on the preparation and use of rhea fiber by Dr. Forbes Watson. Last year, however, says the *Engineer*, witnessed the solution of the question of decortication to the green state to a satisfactory manner by Mr. A. Favier's process. This process consists in subjecting the plant to the action of steam for a period varying from ten to twenty-five minutes, according to the length of time the plant had been cut. After steaming, the fiber and its adjuncts were easily stripped from the wood. Mr. Favier's process greatly simplified the commercial production of the fiber up to a certain point; but it still stopped short of what was required, in that it delivered the fiber in ribands, with its cutaneous matter and outer skin attached. Various methods of removing this were tried without success, until a year ago the whole case was submitted to the distinguished French chemist, Professor Fremy, member of the Institute of France. Professor Fremy carefully investigated the nature of the various substances, and found that the vasculose and pectose were soluble in an alkali under certain conditions, and that the cellulose was insoluble. He therefore dissolves out the cutose, vasculose, and pectose by a very simple process, obtaining the fiber clean and free from all extraneous adherent matter, ready for the spinner.

BESSEMER STEEL.—The Scranton (Pa.) *Republican* of Jan. 19th says: "In converting steel by the Bessemer steel process the pressure of blast used generally runs from fourteen to twenty pounds per square inch. Few works have engines of capacity and power sufficient to maintain a pressure of over twenty-five pounds while blowing a heat. On Wednesday, January 23d, however, while blowing a heat in their converting works, the Scranton Steel Company maintained with their engines a continuous blast pressure of fifty pounds to the square inch. On Thursday last they went a step further and performed the feat of blowing a heat in each of their two converters at the same time. The heat weighed four and one-half tons each, and were blown in twelve minutes. So far as known both of these feats are without precedent at any Bessemer works elsewhere."

PLATINUM heated in a forge fire in contact with charcoal becomes fusible. Bonssigaull has shown that this is due to the formation of a silicide of platinum by means of the reduction of the silica of the carbon by the metal. Two German savants have produced the same phenomenon by heating to white heat a slip of platinum in the center of a thick layer of lamp-black free from silica.

SCIENTIFIC PROGRESS.

Will the Telephone Supersede the Telegraph?

The rapid development of the telephone and its many applications to the business and social life of the period are among the most surprising of the numerous astonishing revolutions of modern applied science, and, judging from the outcome of some recent experiments in this direction, it would seem that we are as yet only on the verge of still greater results than those already obtained. Auditors and transmitters have been made more sensitive, and resistance and induction—the great obstacles to telephoning have been materially overcome by ingenious devices. In consequence of these improvements it has been rendered possible for persons to converse without difficulty between New York and Cleveland. There can be no reasonable doubt that the telephone can soon be used with complete success with the ordinary telegraph wires. What the final outcome of experiments of this kind will be it is difficult as yet to conjecture. That one result will be to enlarge the uses of the telephone and make it more and more an adjunct of business methods has already been demonstrated. The problem now is, will it take the place of the telegraph, and, if so, to what extent will it do this? The limit to a telephone's work is the rapidity of a person's utterance. The limit of the telegraph is constantly being extended and we can already in the duplex and quadruplex apparatus and in the more recent devices of the Postal Telegraph Company, which have succeeded so well experimentally see results greater than any which depend on oral enunciation. For general business, indeed, it is hardly likely that the telephone will supersede the telegraph, but the former has a field of its own, which is nearly, if not quite, as important and it promises to create much new business while adding to the facilities for communication. *Manufacturer and Builder*.

New Method of Mounting Reflectors.

It is well known to all who have given attention to this subject, that the optical performance of great reflecting telescopes has not been proportional to their size, and that the mechanical difficulties of keeping a large reflector in proper figure in different positions have been apparently insurmountable. A plan of supporting a large mirror, devised by Mr. Henry, has been adopted in Paris, which, it is hoped, may obviate this difficulty. It consists, in principle, in supporting the mirror upon a second surface, ground to fit it with accuracy when the mirror is in proper shape. If the mirror rested directly in contact with this second surface, no advantage would be gained, since the backing itself would bend as readily as the mirror. Therefore, between the two is inserted a thin stratum of some elastic substance. Mr. Henry has found a fine sheet of flannel to give the best results. The effect of the sheet is to diminish the flexure of the mirror by a fraction depending on its stiffness and on the elasticity of the flannel. Theoretically, it may be considered imperfect, because, in order to act, some stiffness is required in the mirror itself. A perfectly flexible mirror would bend just as much with the flannel as without it. But the flexure of the mirror can, it appears to me, be reduced to quite a small fraction of its amount. Moreover, I see no insuperable objection to the superposition of two systems of the kind; the mirrors resting upon a stiff disk, which is itself supported upon a second one. This plan has been entirely successful in the cases in which it has been applied. Mirrors up to twelve inches in length show not the slightest flexure when moved into all practical positions. Unfortunately it has not yet been tried with reflectors of a larger size.—*From a report to the Secretary of the Navy on improvements in astronomical instruments*.

PHOSPHORESCENCE IN LIMESTONES.—At a meeting of the Academy of Natural Sciences, Philadelphia, Prof. H. C. Lewis exhibited a specimen of limestone from Utah that emitted a lurid red light when struck, scratched or heated. The glow lasted from half a second, when lightly struck, to a much longer time, as the result of a blow. On examination, the specimen proved to be an almost perfectly pure carbonate of lime, with but a slight percentage of impurities. It is loose-grained, white and crystalline, the grains being but slightly coherent, thus giving the rock the appearance of a soft sandstone. It crumbles easily between the fingers, forming a coarse sand. When beaten in a glass tube over a flame, it glows with a deep red light, which lasts for a minute or more after withdrawing the flame. After two or three heatings, the phosphorescent property disappears. A search through the collection of the Academy for limestones having similar properties resulted in finding specimens from Kaghberry, India, which glowed with a strong yellow phosphorescence when heated, although no such effect was produced by scratching or striking. It was of great interest to find that the India limestone alone, of all in the collection, had the precise external characters of that from Utah.

This similarity is more than a coincidence. It confirms Bequerel's view that phosphorescence depends upon physical rather than chemical conditions. In the rocks referred to it is probably dependent upon a disturbance of their loosely aggregated crystalline particles, whether such be produced by percussion, friction, heat or decrepitation.

THE MATRIX OF THE DIAMOND.—Until the South African mines were discovered, the diamond was generally found in sands and gravels different from the mineral in which it was believed to be formed. At Gripurand West, however, the consolidated eruptive mud of the mines was believed by some to be the true matrix of the diamond; but opinions differed on the question, and arguments were found on both sides. M. Chaper, a French geologist, has, however, during a scientific mission to Hindostan, succeeded in finding the diamond in its mother rock. At Naizam, near Bellary, in the Madras Presidency, M. Chaper has found the diamond in a matrix of rose pegmatite, where it is associated with corundum. The tract of country is almost denuded of trees, bare and rocky, and the rains wasting the rocks, every year expose fresh diamonds in the soil. The rock is traversed by veins of feldspar and epidiotiferous quartz. Here the diamond is always found, associated with epidiotiferous rose pegmatite. The diamond crystals observed are octahedral, but less distinct in line than the stones of South Africa, which seem to have been formed in a freer matrix. It follows from M. Chaper's discovery that diamonds may exist in all rocks arising from the destruction or erosion of pegmatite, for example, in quartzites with or without mica, clays, pudding-stones, etc. *Engineering and Mining Journal*.

HOW A SPIDER LIFTS HEAVY OBJECTS.—Last summer, while at Lynchburg, Va., I observed a spider—probably an *Epeira*—spinning a thread down from the upper section of a large fountain on the lawn of the Arlington hotel. He was some eight feet from the surface. I watched him descend to the water, where he captured a beetle that had unfortunately fallen into the large basin. The beetle must have been an inch long. Our *Epeira* made a turn of his line around his captive, and ascended all the way to his nest; immediately descending, he threw another loop around his prey, and again ascended to his nest, continuing this process for full ten minutes. To my surprise, while the spider was at his web, apparently overhauling and tightening the several threads that he had spun to and from the beetle, it left the water, and, evidently by elastic contraction of the threads, ascended full an inch from the surface. The spider spun down another lasso, and threw it round his victim, then retired and was busy with his lines, when the beetle again moved upwards. These operations were repeated, until, at the end of forty-five minutes, he had singly secured his prey in his nest, at a distance of at least eight feet from the water, by this curious and interesting method.—*Science*.

THE PHILADELPHIA INTERNATIONAL ELECTRICAL EXHIBITION OF 1884.—This exhibition, to be held under the auspices of the Franklin Institute, will open September 2d, and close October 11th. Under a joint resolution of Congress, articles from abroad, imported solely for exhibition, may be entered free of duty. Exhibitors must pay an entrance fee of \$5, and from ten to twenty cents per square foot for space. Exhibits will be classified as follows: Production of Electricity; Electric Conductors; Measurements; Applications of Electricity—1. Currents of low power—2. Currents of high power; Terrestrial Physics; Educational and Biographical. The exhibition building is the corner of Thirty-second street and Lancaster avenue, and will be opened for the reception of goods from August 11th to August 30th.

SUGAR IN TOBACCO.—That tobacco, as ordinarily prepared by some of the manufacturers, is frequently sweetened with molasses, honey, licorice, etc., is not doubted, but we think it will be a surprise to most people to learn that a considerable percentage of sugar is a natural constituent of tobacco. Yet such has been demonstrated to be the fact by Prof. Atfield, F. R. S. Eight samples were obtained from planters in different parts of Virginia, Kentucky and North Carolina, which gave, to 100 parts of leaf, from 5.57 to 9.60 parts of tobacco sugar, and from 8.23 to 12.80 parts of total saccharoid matter. In tobacco grown in unfavorable conditions, or without sufficient heat, the amount of sugar is often but a mere trace, while for light colored or bright Virginia leaf it will average about ten per cent.

TO DETERMINE THE ADHESIVE POWER OF GLUE.—Weidenbusch has devised a practical method for determining, approximately, the adhesive power and quality of glue. He first prepares a set of plaster prisms by mixing gypsum and water together in the proportions of one to five. These prisms are 9.2 cm. (about 4 inches) long, with a cross section of 4 millimeters (1/8 in.), and each weighs 1.7 grammes (26 grains). The glue solutions were made from 1 part of glue in 25 parts of water, and the plaster prisms soaked in them for 5 minutes, then dried in the air. Each is then placed on a horizontal iron ring in such a position as to form its diameter, and from its center is suspended a pan in which weights are placed until it breaks. The strain it can withstand is proportional to the adhesive power of the glue.



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SAN FRANCISCO:

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Passing Events.

We have had rather a phenomenal week in these latitudes. Heavy rains, hail, strong winds and sunshine, make up a varied programme, and when we add two earthquakes and thunder and lightning, we began to think the "climate is changing." The lightning knocked down a few electric light wire poles on the Oakland mole, which has set people wondering whether lightning is to be one of the regular features of our climate hereafter.

Storms still continue in the mountain regions, and, although signs of spring assert themselves, winter has still a strong grip in the higher altitude.

Miners and prospectors are busy in many parts of the country preparing to go to the new Idaho mines, and hundreds are now on the way thither.

The Cœur d'Alene miner has quite an original plan for bulling his mines. He shows the new arrival a piece of quartz, and asks him if he can see gold in it. When the tenderfoot says he can see no gold the miner puts a pistol to his nose and again asks him whether he can see gold, and the tenderfoot sweats the rock is alive with gold. In the Spring it will be necessary to sell some of the claims in the same way.

The proposed tunnel on the Cascade division of the Northern Pacific will be 16,600 feet long, 2,400 feet above sea level, and will cost \$3,000,000.

Technical Society of the Pacific Coast.

In the MINING AND SCIENTIFIC PRESS of the 8th inst. was announced the proposed formation of a technical association in this city. A number of gentlemen connected with engineering and kindred professions, who have discussed the subject, have determined to organize a society having for its object the encouragement of social intercourse among men of practical science, the advancement of technical professions, and the establishment of a central point of reference and union for its members. Among the means to be employed in obtaining these ends will be periodical meetings for the reading and discussion of professional papers, and the formation of subordinate clubs of the different branches of the profession. The proceedings of the Society are to be published. Civil, military, mining and mechanical engineers, architects, chemists, geologists, electricians and other persons who by profession are interested in the advancement of practical science will be eligible for admission.

It is proposed to form subordinate clubs like the "sections" in purely scientific societies; each club to act, in a manner, independent, as far as its own affairs are concerned. The usual officers of the Society will be chosen, and each club will have its separate officers also. A board of directors is to manage the affairs of the Society, and have committees on finance and "executive business" to carry on the work. The executive committee is to have supervision of the room, printing, and of a library in case one is created; it will decide also as to the admission or non-admission of any subject for a lecture to be delivered before the Society, and the publication of such letters or papers as may be presented to it.

The permanent place of business is to be this city. Provision is made for honorary members, who will have the usual privileges accorded to such. They are only to be chosen from gentlemen of acknowledged eminence in some branch of the technical professions and science.

As to becoming members, applications for admission to the Society must be endorsed by at least three members, who testify that they personally know the candidate, and that he is worthy of acceptance. The application for membership must contain a statement, over the candidate's own signature, of his age, residence, nature and term of professional service, and that he will conform to the requirements of membership if elected. The Board of Directors pass upon the application; but if a ballot is demanded by two members, a ballot of the Society is taken, and five negative ballots exclude.

Resident members consist of all those members within 50 miles of San Francisco. As to the amount of dues, this will be regulated when the organization is perfected. The sum will be small, as there will be few expenses at first. Provision will be made for incorporating the Society. Amendments to the Constitution will only be acted upon at the annual meetings, so that the time of regular meetings will not be taken up by discussions on constitution and by-laws.

The first meeting of the Technical Society of the Pacific Coast will be held on Saturday evening, March 29th, in the reference room of the Mechanics' Institute. As this is the date of the publication of the PRESS, we will have no report of the proceedings until next week. It is sincerely to be hoped that the professional gentlemen of this city will lend aid and countenance to the new society, for which there is a good field.

The Forestry Commission have issued a circular letter asking for information concerning the effect of the partial destruction of forests in California, upon the distribution of the rainfall, the amount of rainfall, the permanency of springs, the area of snow-covered lands, the melting of snow, the amount of water in the rivers and creeks, comparative frequency of floods and the value and productiveness of cultivated lands. Replies to these queries will be received by the Secretary of the Board, E. W. Townsend, No. 42 Nevada Block, San Francisco.

HYDRAULIC NOZZLE.—The defendant in the case of F. H. Fisher et al. vs. Richard Hoskin has appealed from the decision of Judge Sawyer of the United States Circuit Court to the United States Supreme Court. The judgment of Judge Sawyer was for \$16,000 damages sustained by the plaintiff for an infringement on a patent hydraulic nozzle.

Inventors and the Government.

The Patent Department of the United States government is not only self-supporting, but pays a profit of several hundred thousand dollars a year. It is supported by a direct tax on the inventors themselves, nobody else paying a cent of its expenses. It is, happily, more than any other department free of politics—not perhaps so much as ought to be, yet mere politicians do not care to have to learn technical work.

It is recognized by all that the inventors of this country have contributed more to its material progress than any other class of citizens. They have made the name of America famous all over the world. The ingenuity of our devices, the perfection of our mechanical appliances and fertility of resource shown, are widely acknowledged.

Yet Congress periodically "tinkers" with the Patent Laws of the United States, and often to the detriment of inventors. Anything which at all indicates a propensity on the part of Congress to restrict inventors' rights in any way works a hardship to them. The inventors of the country are perhaps more dependent on capital than any other class, for they are proverbially poor, and capital is always timid. The present Congress is no exception. Several bills have been brought before it to which inventors take exception. It was finally decided to form an Inventors' Association for mutual protection. A convention of inventors has been in session in Cincinnati this week. On Tuesday, at the first meeting, 2,000 delegates, representing nearly every State in the Union, were present. The afternoon session was devoted to organizing. A number of persons sent letters of excuse, among them Elisha Gray, of Harmonic Telegraph fame. Conversation with many delegates shows a strong feeling against the bills pending in Congress concerning inventions and patents, and the discussion of these will take a prominent place in the proceedings of the convention. At the night session permanent organization was effected, with James S. Zerbe, of Cincinnati, as President; one Vice-President from each State and the District of Columbia; Secretaries, Charles M. Travis, of Indiana, and J. Burleigh, of Massachusetts; Sergeant-at-Arms, John J. Gaghan, of Cincinnati.

It seems strange that such steps should be necessary on the part of so useful a class as inventors. The results of their work are felt in all branches of industry and in our households. They pay for what the Government gives them and ought to be fully protected. As soon as the full proceedings of the Inventors' Convention are at hand we shall give the results of the deliberations.

There are now before Congress three House bills and one Senate bill, which are aimed directly against property in patents, and are very obnoxious to inventors. Of the House bills two have already passed by a large majority, (one of them by 114 to 6,) and are now awaiting the concurrence of the Senate. It has been suggested that all manufacturing inventors, and those who wish to uphold the industries of the nation, should write directly to Senators, and give reasons why those bills should not become laws, without waiting for any concerted action.

Among the more recent bills introduced in Congress is one by Representative Greenleaf, which provides for the appointment of three Commissioners by the President, whose duty it shall be to examine, revise and report to Congress upon the patent laws of the United States a remedy for infringements of patents and the internal administration of the Patent Office. They shall also report such amendment to the patent system as is expedient in a single code or in drafts of separate laws.

The fire in the Seattle mine of the Oregon Improvement Company has gone beyond control. All of the east side has been walled up and it is not deemed possible to save the remainder of the mine from being consumed, as it is impracticable to isolate the fire which is raging in the solid coal on the lower side of the gangways.

ALEXANDER MACKENZIE, Superintendent of the Mount Cory mine, died at Hawthorne, Nev. He was a veteran miner of the Comstock, having for several years filled the post as Superintendent of the Utah, Sierra Nevada and other mines in Storey county.

Air Brake for Cable Cars.

It was found as soon as they began running cable cars in this city that the ordinary brakes on the wheels were not sufficient to hold the cars on steep grades when the cable was released. A track brake was devised, which clamps down on the rails and effectually holds the car. The brake-block is shod with soft wood, and is found to answer its purpose admirably. The only defect is that it does not work on both the dummy and car by the same operation. The dummy man has to ring for the conductor to put this brake on the car, so that time is lost, which, in an emergency, is quite important. The dummy man can only put on one pair of track brakes. On some roads he puts the track brakes on the car itself in operation, but not those on the dummy.

One day this week we had an opportunity of examining an air brake invented by Mr. W. W. Hanscom, and patented through the MINING AND SCIENTIFIC PRESS Patent Agency, which is designed to overcome this difficulty. This brake is applied to one of the dummies and one of the cars of the Clay Street Hill Railroad Company, and can be seen at their engine-house, corner of Leavenworth and Clay streets. The object of this brake is to provide a means whereby the brakes on both car and dummy can be operated by the gripman on the dummy without having to call or signal the conductor to put on the brakes of the car; for in many cases, in the busy streets of the city, such as the lower parts of Market, Geary and Sutter streets, the conductor's time is mostly occupied in attention to passengers, and the application of the brake on the dummy alone will not stop the train as promptly as is desired. At the time that Mr. Hanscom was engineer of the Presidio Cable Road he saw the necessity of placing the entire train brakes under the control of the gripman on the dummy, and he immediately went to work to study up what should meet the requirements covering the arrangement which he has now placed on the car and dummy of the Clay street road, at the engine-house, where it can be seen by those interested. The air cylinders for operating the brakes are placed underneath the car, and a piston-rod from each end of the cylinder takes hold of a bell crank lever, on the one end of which is fastened a wood shoe, which is forced down against the track, forming a skid or track brake. On the dummy is a similar cylinder, and connected in a similar way to the track brakes of the car. The cylinders have air pipes running to each end of the car, and provided at each end with a cock for closing the end of the pipe when the opposite end of the car is connected to the dummy, so that either end of the car may be connected to the dummy or another car may be attached to the train.

The pressure of air for operating the brakes is generated by an air pump, operated by the foot of the gripman whenever desired, no reservoir for the storage of compressed air being used. By properly proportionating the pump and cylinders the action of the brake is wonderfully prompt, and the brakes on both car and dummy are simultaneously acted upon, two seconds only being required to bring them into action. The simplicity and efficiency of Mr. Hanscom's air brake will commend itself to those who desire an additional safeguard from accident to those crossing in front of the dummy, and a more perfect control of the train than has hitherto been possible.

CONSIDERABLE excitement prevails at Heron station, on the Northern Pacific line, and vicinity, over a recent discovery of gold near the point mentioned. A party of men engaged in opening a trail through to the Cœur d'Alene mine accidentally discovered gold in the sand one morning at a place where they had camped. A number of claims have been staked off, and people have commenced flocking to the new discovery. Two quartz ledges were discovered near the camp, which greatly augments the excitement.

IN crosscuts Nos. 1 and 2, on the 3100-foot level of the Union Consolidated mine, on the Comstock, the diamond drill was advanced through the water belt, and pipes and cocks put in, by means of which the water may be drawn off as it can be taken. Managed in this way, there can be no trouble with the water.

A NOTED English authority, speaking of copper, says: "From the reports of several companies, lately issued, it would appear that the present range of prices must approximate very closely to the cost of production at several mines which produce large quantities of copper."

The Victor Rotary Tricycle.

There is a certain fascination for mankind in any mechanism by which they can apply their muscular power so as to progress more rapidly than by walking or running. This is well shown by the many attempts to perfect flying machines, and the great expenditure of money in this direction, to say nothing of various vehicles for traversing land or water.

But perhaps the best and most satisfactory results for the amount of power expended have been accomplished by the use of the bicycle and the tricycle. Both these vehicles are now pretty well known, but without a critical examination but few can conceive the wonderful perfection to which the manufacture has been carried.

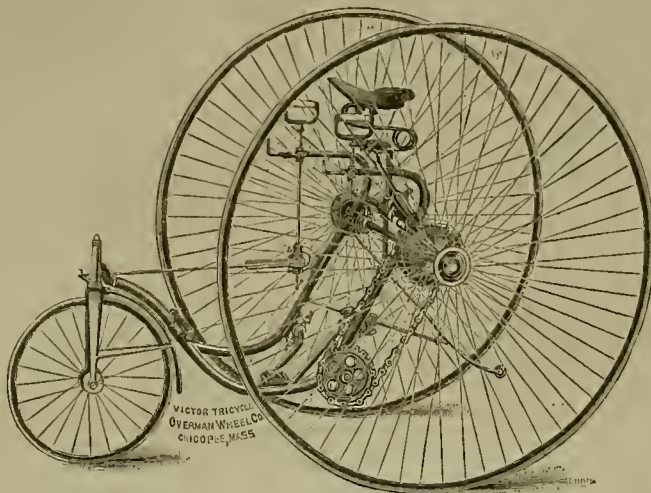
With the wire spoke or spider wheels, rubber tires, and hollow steel tubing for the framework, the lightness and rigidity attained are something marvelous. We present herewith an engraving of one of the best tricycles that has yet been put upon the market, built by the Overman Wheel Co., of Chicopee, Mass., of which Mr. Geo. H. Strong, of Dewey & Co., is agent for this coast.

Profiting by their experience last year, the company have almost reconstructed their machine, and it now stands at the head of the machines in the market, while the price (\$160) is a long way inside that of any other first-class machine. The following are a part of the improvements that have been made:

The driving wheels have been reduced two inches in diameter, being now 48-inch, and the steering wheel has been increased from 16-inch to 18-inch. The crescent rims are lapped, milled and brazed, the spokes are direct double butt-ended, 60 to driver and 24 to steerer. The forged steel hubs retain the same 6-inch "dish," but are increased in diameter from three and a half inches to four and a half inches. A brass, nickel-plated cap fits into the recess, flush with the hub, adding greatly to its appearance and covering the ends of the spokes and nuts. The tires are seven-eighths to drivers, and three-quarters to front wheel, of red moulded Para rubber, compressed into the rims by the patented process of this company in such a way that they will not come out, though by the application of heat they can be removed, if necessary, to replace a broken spoke or for any other reason. The frame is a model of gracefulness, as will be seen by the illustration. It is of wellless steel tubing, one and one-eighth inches in diameter, extending from side to side in one piece. The backbone of the small wheel is securely brazed to the end of the loop, and is one and a quarter inches in diameter, tapering to the neck. The frame is much higher from the ground than the one of last year, so that there is no danger of striking anything in the road, while the fact that the loop is in one piece adds materially to its strength and somewhat to its lightness. The foot rest, with corrugated rubber, is fastened to the frame at the end of the loop in a secure manner, and can be used for mounting, and will not rattle. The head is of the Stanley pattern, with four and a half inch centers. A spring top oil feeder is placed at the top, and the whole is covered with a brass, nickel-plated dust guard. The steering is completely changed. The arm is placed at the bottom instead of at the top of the head. The steering rod is fastened to the arm with a coned screw bolt so that wear can be taken up and rattle absolutely prevented. The rack and pinion steering has been discarded, and a neat, plain disk or drum, to which is fastened two phosphor bronze ribbons, are used instead. The annexed illustration will show their method of action. That they are smoother and more even in their action than the rack and pinion we can testify, while their durability has been thoroughly tested, not only on the machine, but in the works. They were fitted to the machines ridden in the Springfield races last fall, and have been used more or less ever since. It is claimed for this steering that there is no lost motion, no perceptible wear, no rattle, no dirty gear, the same evenness of action the entire length of the steering, and nothing to catch and soil the dresses of ladies. The plain bearings, which are greatly disliked by many riders, at the ends of the crank shaft and pedals, have been replaced by Bown's Eolus ball bearings, as on other parts of the machine. Those of the crank ends are placed under the frame, being out of the way, besides bringing the pedals a little more under the saddle. This will permit of a vertical action without placing the seats so far forward. The pedals are fitted with square instead of round rubbers, and a neat steel pedal slipper is in process of construction. The square rubber will give more bearing surface, and can be turned at the proper angle to fit the curve of the foot. The seat rod, steering and purchase handle rods, are adjusted with a cam bolt. The band holds are of white celluloid, as last year, but are sunk into the handle in a somewhat neater way. The hand brake is a push lever working on a segmental rack in such a manner that it can be left at the desired point. If preferred, the ordinary lever will be fitted in its place. In view of the fact that many would-be tricyclists have no suitable place to store a three-wheeler of this pattern except by taking it through a narrow doorway, which has hitherto been impossible, the Victor is fitted with a

patent cut-off axle, by which the right-hand wheel and a piece of the axle can be removed, rendering the machine narrow enough to be passed through an ordinary doorway. The method of attachment, consists in brief, of a coned end, a square shoulder, and a threaded sleeve. The strength of the attachment has been tested thoroughly it being proved that the axle is strongest at the cut-off. It has been in use over six months with satisfactory results. The differential gear is substantially the same, but is more carefully made, the gears are all of cut steel. The trail rod is more securely fastened than formerly, being a weldless steel tube screwed into a threaded socket, the brace being put through a split lug and held with a headed bolt.

The machine is finished in plain black-polished Harrington's enamel, with a few parts nickel-plated. It is fitted with the cradle spring, adjustable Victor long-distance saddle, suitable dress and mud guards, and provided with the necessary wrenches and oil cans. Total weight, about



THE VICTOR ROTARY TRICYCLE.

ninety pounds. Notwithstanding the great increased cost of manufacture, the new Victor is placed on the market at the same price as last year's machine, viz., \$160. These machines can be ridden equally well by gentlemen, ladies or children being adjustable to suit almost any size. Besides the amusement thus afforded, they are useful in the way of business. We know of many which are used every day in going from place to place on business or errands. They must not be tied, eat nothing, and when the rider is experienced, will travel any long distance as fast as one cares to drive a horse for the same distance.

A BULLION REFINING CONTRACT.—The Castle Dome Mining and Smelting Company bring suit in the Superior Court to recover \$30,000 damages from the Enterprise Mining and Irri-

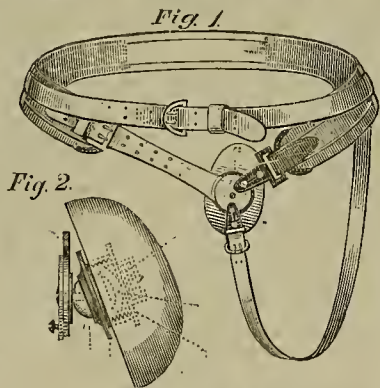
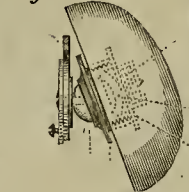


Fig. 2.



McLEAN'S IMPROVED ELASTIC TRUSS.

gating Company for an alleged breach of contract made on the 7th of January, whereunder defendant agreed to send by rail to plaintiff's reduction works at Melrose, for refining and separating all the bullion produced at its furnaces at Eureka for one year, and pay for the work \$30 a ton, less certain rebate. That during January defendant delivered six car loads of bullion at Melrose, aggregating about 74 tons, which was assayed, and defendant drew draft for \$6,500, which plaintiff paid. On February 7th, defendant repudiated the contract, wherefore plaintiff claimed damages as above stated.

It is said that the Lost River country needs only the proper development to show immense mineral wealth, and place the name of her mines among the best in Idaho. It is expected that 600 men will go into that region from different parts of the Territory within the next month.

E. M. COOPER has been appointed General Superintendent of Wells, Fargo & Co's Express for the Western department, which embraces all the lines west of the Rocky mountains, including those in Texas, Louisiana and Mexico, with headquarters at San Francisco.

An Improved Surgical Appliance.

Among the many things for which we of this generation should be thankful are the improvements in anatomical implements. A great deal of ingenuity and inventive talent has been expended on this class of appliances. Many of the ills that flesh is heir to, happening to a man 50 years or so ago, had to be borne in pain and suffering, which now are quickly relieved or entirely cured by suitable appliances invented by men who have made a specialty of such things. One of the most common, perhaps, of the afflictions with which mankind is visited is rupture. This, by medical men called hernia, is the protrusion of some portion of the bowels, or of the viscera usually contained in the abdomen, through any part of

placed a leather packing, upon which the ball works, and prevents any friction or harshness by metal coming in contact with metal.

By this construction it will be seen that the pad will easily move to any point of a circle, and readily adjust itself to any surface or action of the body, and with the least possible pain or inconvenience to the sufferer. In order to obtain a greater or less pressure of the pad on the ruptured parts, the screw coupling in which the ball works is adjustable so as to relieve or increase the pressure of the ball on the coiled spring and pad. Once fixed with the required pressure, the implement is perfectly self-adjusting, and, while keeping a constant pressure, is at the same time elastic. In fact, so constant and regular is the pressure that it is claimed to be not a mere support, but a radical cure for the complaint for which it is intended. Alfred A. McLean, the inventor of this I. X. L. Truss, has in his possession the written endorsement of very many surgeons and physicians as to the utility of his invention. He has also several gold medals which have been awarded to the device. It is worn by a great many persons, and in the four years it has been in use is claimed to have made many hundred cures.

Cœur d'Alene Mines.

Although hundreds of miners have been gathering along the convenient places to start for the new Idaho placers, comparatively few have gone into the mines so far. Within the next three or four weeks, however, the great "rush" will take place. The men have been told to wait until April, and the opening of the month they will start. Just now many very absurd stories of the new region are being circulated. The transportation companies, of course, are helping the boom. A circular issued by the N. P. R. R., for instance, contains the following paragraph:

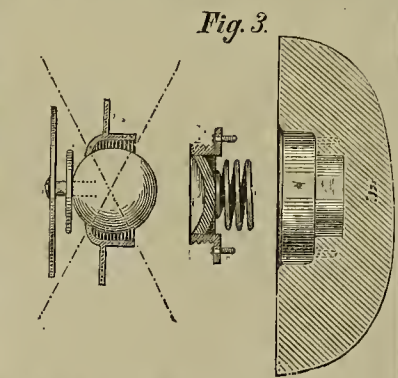
"There is no one than enough for all who come. The minerals consist of silver, tellurium and free milling gold. One hundred dollars per man per day are being taken out of the rim rock of the gulches, while in gulches \$25 to \$40 per man per day are being panned out. The claims are all very rich. Wherever the hedgerock has been uncovered, beautiful, rich dust has been scooped up by the lucky owners. On Pritchard creek can be seen valuable placer claims that have been opened, and not in a single instance has the work of development been advanced without a correspondingly rich return in bright, free gold quartz."

Men who go into that country ought to see that they are pretty well fixed for funds so as to get out if necessary. There is little chance that one in ten of the men who go will strike it. Anyone who has ever been to one of these excitements knows what a crowd of dead-broke men there is at such places. And to be broke where there are hundreds in the same fix is not a comfortable experience. The men already in the camp can do little as yet on account of the deep snow. And it is doubtful if there will be much chance for work for a month or so yet to come. Good outfits are needed in so inhospitable a country and any miner who goes ought to try and keep by him a stake to get away with in case of disappointment.

One of the ways of booming the country is in exhibiting rich nuggets of gold. It will amuse many to know that numbers of these rich specimens which advertise the new region, come from California, and the old mining State is utilized in advertising the new mines. How this is done is told in the Salt Lake Chronicle.

A reporter this morning met a wholesale merchant of San Francisco, who is the owner of one of the most complete cabinet of ore specimens on the coast, and a light heretofore unthought of was instituted into the Cœur d'Alene question. He said to the reporter: I had in my cabinet about sixteen ounces of free gold quartz specimens from Amador county, which I had bought at from \$5 to \$10 an ounce. While in San Francisco the last time a Kearny street broker came to me with a proposition to purchase my specimens, and offered me \$30 an ounce for them. The offer looked so large that I was induced to ask him what he could do with them and get his money back, after paying that figure. He produced a letter from a reliable man of Portland, Oregon—whose name I have forgotten, but who owns claims in the new district—authorizing him to buy up the best specimens of free gold quartz he could find, and send them to him at Portland. The Portland man agreed to pay \$40 per ounce upon receipt of the specimens. Well, I sold sixteen ounces at \$30, and received his check for \$480. I also learned from the letter that most of these specimens were to be sent to Spokane and railroad points near the new district, and be exhibited as the productions of the Cœur d'Alene District. The fact in the case is simply this—they haven't got any specimens out of the new district worth showing, and to keep up the boom they were compelled to resort to such measures and trades as the one they made with the pawn broker of San Francisco. I have learned that he is still engaged in buying the best specimens and sending them to parties near the Cœur d'Alene.

the walls of that cavity. Unless the skin is wounded from without, the rupture remains covered by it, and by certain tissues which lie beneath it at the points where the accident usually occurs, these points being at those portions of the walls which are naturally thinner and weaker than others, or at which there are openings, naturally, for the passage of blood vessels. Many forms of trusses have been devised to cure the complaint, and a good deal of ingenuity has been displayed. It has been found, however, exceedingly difficult to construct one which is self-adjusting, elastic and constant in its operation, which would not at the same time annoy the wearers. The engravings on this page show a form in successful use, in-



McLEAN'S IMPROVED ELASTIC TRUSS.

vented and patented by Alfred A. McLean, of this city, and called the I. X. L. Elastic Truss.

The principal feature of the invention is the combination and construction of the peculiar devices for supporting the adjustable pad, and for varying the pressure of the same on the parts to be supported. The pad is recessed to receive a screw coupling plate, and also a still deeper recess in which a coiled spring rests. The plate is held to its seat around the upper recess of the pad by screws. Fig. 1 of the engravings is a view of the truss pad and supporting strap. Fig. 2 is a side elevation of the pad and the devices for connecting it with the belt, and Fig. 3 a view, partly in section, of the same parts disconnected.

To the end of the leather strap is connected the ball and socket, the end of the strap being held between two plates of metal, a screw going through all and holding the ball rigidly. The socket receives the ball previous to its being fixed by the screw. On the coiled spring is

Tungsten.

Sources.

The element tungsten has the general characteristics of a metal, but it is also capable of acting as a non-metallic element and can form an acid—tungstic acid. It is in this role that it is always found in nature, as the tungstic acid salt of iron, manganese, calcium, or lead. These tungstates are rare. The most abundant is wolfram, a mixture of tungstates of iron and manganese in varying proportions. The tungstate of iron may replace the manganese almost entirely, when the mineral receives the name ferberite; or the manganese may replace all the iron, giving the mineral hubnerite. Besides these, scheelite the tungstate of calcium; scheelite, tungstate of lead; and wolfram ocher, the anhydrous acid itself, are found in small quantities. Wolfram is found in the United States at Charles Lake's mine, Munroe, Connecticut; at Trumbull, in the same State; and at Blue Hill bay, Maine, on Camdage farm. Although the deposits are never very extensive, an attempt has been made to work the mines in these localities, but the ore has not proved rich enough, and at present no wolfram is mined in the United States. Wolfram also occurs at the Flowe mine, in Mecklenburg county, North Carolina; in Missouri near Mine La Motte, in Saint Francis county, near the Saint Francis river; and in the Mammoth mining district, Nevada.

Value.

Wolfram usually contains from 35 to 55 per cent. tungstic acid, and is worth about 10 cents per pound, or \$80 to \$100 per ton, in Germany. It is subject to an import duty of 20 per cent. ad valorem. The price has been rising slowly during the past year or two, not however from any marked increase in the demand. Metallic tungsten is worth 60 to 80 cents per pound in Liverpool.

Utilization.

Tungsten holds a peculiarly uncertain position from an industrial standpoint. It has been recommended for use in many widely different industries; but thus far it has not gained extensive application, principally for two reasons: it has proved either too expensive or it has failed to yield the advantages claimed for it in particular cases. Under the former may be mentioned the projected scheme of saturating inflammable fabric with a solution of tungstate of soda to render them proof against fire; but experiments have usually drifted off to alum or some other cheap substance. Tungstate of soda is one of the many substances proposed for the prevention of boiler incrustations. Soluble tungstate are used to a limited extent in calico printing. By far the most important application of tungsten that has ever been proposed is in the manufacture of steel for certain special purposes. An extended treatise on this subject will be found in the work by J. S. Jeans, (a) of which the following is a summary:

It was shown by the Duc de Luyne, in 1844, that a feature in the so-called damask steel was that it contained tungsten. Later in 1860, F. A. Bernoulli made a series of experiments at the Royal Iron Foundry, in Berlin, on the alloys of iron and tungsten, which led him to the following conclusions: 1. By mixing tungstic oxide with turnings of gray cast iron and fusing them, the tungsten is reduced to the metallic state and cast steel is formed. 2. The carbon of the cast iron, and particularly that portion which is mechanically mixed with the iron, is consumed in reducing the oxide of tungsten, and metallic tungsten appears partly to take the place of the carbon in the steel.

There has been much dispute as to the real advantage of this replacement of carbon by tungsten. Mayer of Leoben, Styria, is assigned the credit of having first applied tungsten to the manufacture of steel on the large scale, and owing to the success which he attained, tungsten steel has been declared to be of the highest quality in respect to fineness of grain, uniformity of structure, hardness, toughness, strength, and durability; but numerous adverse opinions have followed the experiments of others. Tungsten, like carbon, appears to diminish the ductility of iron; though by melting tungsten and iron it is possible to obtain steel much harder than with carbon alone, without the danger of incurring at the same time an excessive fragility when cold or difficulties of working while hot.

For uses which require an especial degree of hardness, a steel rich in tungsten, called "special" steel, is frequently employed. Thus a fine Sheffield steel for lathe tools contained, according to an analysis made in the laboratory of the Stockholm School of Mines, 9.3 per cent. of tungsten, 0.7 per cent. silicon and only 0.6 per cent. carbon. This steel, which is used without being tempered for turning cylinders of cast iron, is of sufficient hardness to scratch glass and yet is not fragile, for great difficulty is experienced in breaking a punch bar.

The hardness communicated to iron by tungsten is not increased by tempering. Steel rich in tungsten cannot be hardened without breaking. It can only be worked cold by grinding, on account of its excessive hardness; by working hot with caution the desired form may be given to it, but steel rich in tungsten must be managed with great care to prevent its cracking, and it must be treated several times in succession before the desired form is attained. After the form is obtained by hammering hot, the steel should be hammered with quick light

blows nearly cold before it is allowed to cool gradually.

In order to produce tungsten steel it is necessary in the first place to rid the wolfram of the impurities which it contains. According to Jacob it must in the first place be roasted, then treated by diluted acid, and finally washed with water; in this manner the sulphur and arsenic are eliminated. After being dried the residuum is raised to a strong heat in crucibles lined with damp charcoal, the tungstic acid is reduced to the metallic state, and a compound is formed containing iron and manganese. The product thus obtained is of a dark color and great density. From 5 to 25 per cent. is added to the steel, according to the proportion of tungsten desired.

To produce Bessemer steel containing tungsten Le Guen adds to the molten metal, when the operation is finished, some pig containing tungsten, also in the liquid state. This pig is prepared from a mixture of 90 per cent. wolfram and 10 per cent. of lime with tar. According to Le Guen, the tungsten increases the hardness of the metal, and up to a certain point, its tenacity also. If, on the other hand, the proportion of tungsten becomes rather high, the strength diminishes.

Musket has obtained a patent for producing tungsten steel by mixing finely pulverized wolfram with an equal weight of melted pitch, after which the mixture is run out on a dry stone slab, and is added in certain proportions to crucible steel. Musket's "special" steel made in this way is remarkable for its hardness and strength. This class of steel is manufactured in Germany at the works of Wundt & Co., at Buckaw, near Magdeburg, in Prussia; and in Hanover at Uslar on Solling. The magnets used at Siemens' telegraphic works in Berlin are also said to be made at Mosabit of this steel. Its qualities are very different from those of ordinary steel, as although when annealed it is so hard as to resist the best files, it becomes soft when chilled, and presents an exterior full of cracks, for which reasons it must not be hardened. At a red heat it is malleable and is easily worked, but all tools made of it must be brought into shape by the hammer at once, and finished if necessary under the grindstone, as the file will not touch it afterwards. Tools of tungsten steel in use for planing and other machines at the Engine Works of Knoevenagel, in Hanover, are reported to stand longer than those made of the best Sheffield cast steel.

A species of steel invented by H. A. Levallois, of Paris, has been patented in England. This is said to be an alloy containing tungsten and nickel in various proportions, and it is claimed to be less liable to oxidize or rust than ordinary steel.

C. W. L. Bierman, of Hanover, manufactures alloys of cast iron and steel containing from 20 to 50 per cent. of tungsten, and from 1½ to 6 per cent. of manganese, in ingots, which are sold for mixing with (and so introducing any desired percentage of tungsten into) iron or steel.

Experiments with tungsten steel have been made at Park's works, and at several establishments in Pittsburgh, but as yet it has not assumed industrial proportions in the United States. It does not seem probable that it will become a rival of chrome steel.

GOLD SHIPMENTS ABROAD.—Mr. A. S. Hatch, President of the New York Stock Exchange, says: "I do not think the export of gold at the present time a matter of any serious consequence, or that it should cause any agitation or alarm. Our reserve of gold in this country now is so large that we could readily spare \$40,000,000 or \$50,000,000 without any noticeable effect being necessarily produced. The only way in which evil can result from it would be by speculators or by the press magnifying its importance and creating alarm on the subject, which might lead to large hoarding of gold in this country. I do not think, however, that this is likely to take place, because the American public are reasonably intelligent, and are not likely to be frightened out of their wits because we, in the natural course of commerce, ship a few millions of gold. On the other hand, I think the impression which will be made abroad by the fact becoming apparent that when occasion requires we can ship gold without any disturbance of financial affairs in this country will have a tendency to increase confidence abroad in our wealth and stability and in the value of our securities. I have no idea that the shipments will reach a magnitude which need cause the slightest anxiety or disturbance. We have over \$600,000,000 of gold in the country. The shipment of even \$100,000,000 cannot injure us if it is regarded, as it should be, as the natural result of interchange of commerce between nations. Harm only could result from excitement, and, as I have said, I think the American people are too well informed to see the matter in any but its proper light."

HOW TO ADVERTISE A MINE.—The following is taken from an Arizona paper, and shows the enterprise of a man who wants to sell a mine: Fifteen hundred dollars—Hi, Jamie! Get money. Get it honestly, if you can, but get it anyhow. That's me. Union mine for sale at \$1,500. Lead, silver and gold! About four miles from Crittenden, on A. & N. M. R. R. Good road all the way; no hills. Practically inexhaustible supply of water within 100 yards. New developments. Don't ask me to write a geological essay. Come and see. All tape-line experts warned against sampling my well.

Ghouls and Body Snatchers.

There has been a startling number of grave-robbing cases reported in the newspapers of late. The sacredness of God's Acre is no protection against the ghoul who gloats in his secret and unholy calling; the family shrine where we love to lay our offering of flowers, commune with the sweet memories of our dead, and feel through urned ashes after the reality of an immortal life, possesses no sanctity in the eyes of the "resurrectionist," who makes a foul livelihood out of the decayed remains of human mortality. Social obligations, domestic sympathies, tender sentiments, inspire no respect in the bosom of the ghoul.

And yet science must not suffer; it is essential to the proper equipment and knowledge of the physician and surgeon that they be thoroughly instructed in all that pertains to the human anatomy. Operations performed on the human body without the aid of the knowledge acquired at the dissecting tables would be taken out of the realm of science and relegated to blind chance. But all this, and more that might be said in the interests of health and surgery, will not justify the spoliation of burial acres, which is not only a sin against the dead, but outrages the tenderest and holiest sensibilities of the living. The good results do not justify the unclean and hideous wrong. Science has no heart, no sentiment, no veneration. It threatens to plow up all our graveyards and heat our marble-tomb vaults into cremation furnaces to gratify a sanitary whim. The poet says the scientist would "peep and botanize over a mother's grave," but we cannot approve of its invading private property and rifling the coffin in order to obtain material for the dissecting room. It is a form of robbery that the beneficent intention cannot make allowable.

But it may be a matter of inquiry how far the severity of the law and an irrational public sentiment may have been the cause of this increase in grave robberies. When the law insures the safe and decent interment of all dead bodies claimed by relatives or friends it would seem to have paid sufficient deference to the sentiment of society. No good reason can be alleged why deceased criminals and paupers, who have been a charge upon society, and whose bodies are unclaimed for interment, may not be turned over to the medical colleges. It is the only compensation they can make for the wrong or the burden they have been. It is only the feeling of living persons and the sacredness of private property that science should be taught to respect; but the health of the living is of more consequence than the method of decomposition after death in those cases where no living person is concerned to provide interment.

The recent cases of body snatching in the vicinity of Chicago illustrates the evil results which come from an unwarranted interference of the law and public prejudices. The State law provides that in all cities and counties with a population exceeding 100,000, the Superintendent of penitentiaries, Wardens of poor-houses, Coroners and public undertakers, may deliver the unclaimed bodies of deceased persons to the medical colleges. Under the operation of this law sufficient cadavers were procured, and the scandal of grave-robbing rarely heard of. But as soon as this law was rescinded, at the behest of popular prejudice, the resurrectionists immediately resumed business. The medical schools were compelled to procure bodies; good prices were offered, and the best-guarded cemeteries became a harvest field for the midnight ghouls. So extensively has the business been carried on that an eminent Chicago physician said to a reporter of the Chicago Press, that "if the graves of those who have been buried during the past year in the different cemeteries were opened, one-half the coffins would be found empty." If such be the condition of affairs in the beautiful and well-protected cemeteries of the large cities, what must be the condition of the rural graveyards? It is evident that something must be done to stop this desecration of burial places and outraging the sensibilities of the living.

It is evident that the law that stops the supply of cadavers from the penitentiaries, poor-houses and hospitals encourages body-snatching; and if the sources of supply from the graveyard should be cut off by the vigilance of the police, there would be danger of a still greater crime against humanity, such as occurred at Avondale, near Cincinnati, the other day, becoming frequent. If dead bodies cannot be had, they will be made by the murderer's club or poison. Within the memory of men still living, a wholesale system of murdering was carried on in the cities of England and Scotland, in order to furnish subjects for the surgeon's dissecting table, and it gave a new word—"burking"—to the English language. Public opinion ought to be too well enlightened to make body-snatching necessary to scientific progress, and it is obvious that the unclaimed criminal and pauper dead of our public institutions might be made to yield an ample supply without any outrage to public decency or exposing the tender feelings of surviving relatives to a constant dread.

J. J. TAYLOR and D. H. Foote are about to establish extensive ore and sampling works at Ketchum, Idaho. This is a needed enterprise for those who want their ores sampled independently of the smelting works.

Minor Minerals of the Pacific Coast.

Notwithstanding the fact that the business of mining for the precious metals on the Pacific coast has heretofore engrossed attention to the exclusion of nearly all other metals and minerals, these latter occur in great variety and generally in great abundance. Indeed, there is hardly a mineral product of use in the manufacturing or mechanic arts or of interest to science that has been found somewhere in this region, though not always under conditions which impart to it any large present commercial value. Thus, while it has been possible to profitably work deposits of coal, copper, cinnabar sulphur, borax, and a few others, there are a variety of substances, such as mica, zinc, nickel, niter, antimony, diamonds and other precious stones, plumbago, manganese, platinum, etc., which, though justly entitled to a place among the mineral resources of the region, have as yet proved to be of little or no economic value because of their limited quantity, imperfect quality, difficulty of access, or other unfavorable conditions.

In addition to those above mentioned, the metals and minerals found in the Pacific States and Territories under conditions which give them some, and in most cases, a large present or prospective value, may be enumerated as follows: Iron, lead, salt, soda, petroleum, asphaltum, gypsum, marls, asbestos, tin, chromic iron, hydraulic cement, marble, chalk, lime, fissile slates, mineral pigments, infusorial earth, kaolin, fire and other valuable clays, alabaster, magnesia, steatite, mineral soap, alum, arsenic, emery, ochre, bismuth, tellurium, cobalt, molybdenum, etc.

Besides the deposits named elsewhere in this volume which have been worked continuously and with profit, there are some others the working of which, after a trial, had to be abandoned, labor and the other factors of production having been too dear or the home demand too limited to warrant a continuance of operations. Thus attempts to utilize the deposits of plumbago, chromic iron, fire and other clays, manganese, antimony, etc., have either wholly failed or have been continued in only a feeble and spasmodic way.

Some of these industries, after languishing or being wholly extinguished during earlier struggles for existences, having at a later period been resuscitated, have since prospered and grown into large proportions, the production of copper, borax, and petroleum furnishing notable examples of this kind. It is the case, in fact, that nearly every industry belonging to this class has at one time or another experienced seasons of great depression, owing to the prevalence of low prices for the particular product; or, as in the case of quicksilver and borax, because of a real or apprehended overproduction. Never, however, have any of these pursuits failed by reason of the inferior quality or any lack of the raw material.

But for the greater allurements presented by gold and silver mining the other mineral resources would no doubt have met with much greater development than they have done, the high prices and the instability of labor in connection with the excitements incident to gold mining having for a long time tended to prevent such development. Since the exhaustion of the more accessible surface deposits, placer operations have been on the decline, reducing in like ratio the wages of unskilled labor, and causing that class of miners to seek employment in other occupations. With this altered state of affairs mining pursuits have become more diversified, men of enterprise and means having been encouraged to experiment with a variety of the more common minerals and metals, the most of which had before been neglected or had been worked at a loss. There is reason now to believe that these efforts will meet with better results and ultimately be so extended that most of the local requirements will be supplied from home sources, with a surplus of some commodities for exportation. In the past the Pacific coast has numbered among its exports quicksilver, lead, borax, copper, and several other important substances, and the list is gradually increasing. Moreover, there is a corresponding increase in amount making itself apparent. As the country grows in population and railroad facilities are extended, mineral deposits become available which, though they have long been known to exist, have not been before utilized.

HANDY MINE.—The mine on all this coast that is located nearest an express office is that known as the Fleming of Nevada City. The tunnel runs right under the town and directly under Wells, Fargo & Co.'s office has been, and we believe still is, a rich bunch of quartz. The rock is not so deep down but that occasionally Mr. Tower, the gentlemanly agent of the Express Co., can feel the blasts that are set off in the mine in order to loosen up the quartz ledge. The perpendicular distance between the safe of the express office and the gold-bearing bunch is not over 150 feet, we believe. The gold, however, does not get up into the express to be sent away, but goes out through a tunnel and to a mill before Mr. Tower gets a chance to ship the stuff to the coin factory at San Francisco. Still the Fleming mine is handy to the express office.—*Poathill Tidings.*

Shipping Ore to Colorado.

Concerning the results of shipping ore from San Bernardino county, in this State, to Colorado, the *Calico Print* says:

During the past week or two, some person or persons started the report that Mr. H. B. Stevens of Calico had received very poor and unsatisfactory returns from the ore that he had sent recently to Pueblo, Colorado, and various were the comments among the miners in regard to the matter. As usual in such cases, the report was accepted as the truth, and many wisacrees found ample time to tell their experiences, all tending to corroborate the report.

It was our good fortune to meet Mr. H. B. Stevens on the 8th instant, and with note-book in hand, drew from him the following facts, and as we believe they are of much importance to our readers, we will add that Mr. Stevens gave us this information without any reservation, and in a very candid manner, apparently fully realizing the importance of the subject, so far as it affects the business prosperity of the camp in general. Mr. Stevens said that in regard to the report that his returns from ore shipped to Pueblo had been "unsatisfactory," that such report was false, and that on the contrary, the returns were far above his expectation, and therefore had given perfect satisfaction. On January 19, he shipped twenty sacks of ore from the Carbonate mine of Mineral Lake district, situated some twelve miles south of Bagdad station. At the time of shipment he sampled the ore as well as he was able, in a crude manner, and bringing the samples with him, had them assayed at Calico. This sample went \$72, no test being made for copper. The return he received from Pueblo was \$116 silver and 20 per cent copper, for which they gave him \$20, or one dollar for each per cent. So favorable was the result that he immediately set men at work to get out ore for shipment, and they are now hauling sufficient for a car-load to the railroad, which will be forwarded from Bagdad as soon as possible. On January the 29th he shipped one car-load of Kearsage ore from Calico from which he has received no returns, save a short note, written February 22d, acknowledging the receipt of the same, and saying that they would be able to pay him "fancy prices," meaning that they would allow him a price above their usual rate of percentage. Since then the railroad blockades have interrupted all communication. Not only have the Pueblo company been prompt in their business affairs, but also liberal in their dealings. They guarantee 90 per cent on \$100 ore; special rates on richer ores.

At the Kearsage mine at Calico of which Mr. Stevens and Mr. Robt. McCullough are the owners, they have two car-loads of assorted rock now ready for shipment to Pueblo, which will be forwarded as soon as the roads will permit; also ten tons that will be worked within a few days at the Oriental mill at Daggett. A tunnel is being run on the ledge that has reached the depth of fifty feet below the surface, and shows up at least one thousand tons of ore that will yield at least \$100 per ton. They offered this mine for sale about a month ago for \$15,000 and refused an offer of \$10,000. Now it would take \$30,000 to buy it.

This one by one are our mines placing themselves on a good footing, and adding a splinter to the lever that moves the world.

SWEDS DANES AND NORWEGIANS.—On the information of Herr August Berggren, the Swedish Consul, it is stated that there are about 6000 Norwegians and Swedes in this city; and on that of Captain Simpson, the Danish Consul, the resident Danes of San Francisco are placed at 3000. In the State there are close on to 5000 Danes, while of Norwegians and Swedes there are about 18,000 on the coast. Very many of these are men who found work on the Northern Pacific Railroad. The great rain-water State of Oregon is a favorite abiding place of the Scandinavians, while California has also unusual attractions for them. That is, unusual in comparison to the Eastern States, and mainly because the climate has none of those extremes which try his constitution in the burning summer months. The residents of lands that both border on and are within the Arctic circle dread those three scorching months, July, August and September, and during the last few years a steady stream of immigration has set in toward us from the East. There are two other regions besides the States of California and Oregon that offer special inducements to the Scandinavians, Utah being the one and Hawaii the other.

A CANDID OPINION.—T. R. Woodruff publishes a letter on the *Coeur d'Alene* mines in the *East Oregonian*, in which he says: "Last August I went up into the *Coeur d'Alene* country thoroughly equipped for prospecting, and for four months I prospected diligently throughout that section on Pritchard and Eagle creeks, the most of their tributaries and the neighboring streams and gulches, and, although I found some colors, I failed to procure, in a single instance, what could be called a paying prospect. In conclusion, I will say, with an experience of over twenty years in mining, and the knowledge I have of the *Coeur d'Alene* mines, that they are the biggest fraud and humbug of the nineteenth century, a delusion and a snare, and a good country to stay away from."

USEFUL INFORMATION.

Peculiar Wood Working.

The auger is intended primarily for making holes in wood, yet the only cutting or boring portion is the chisel tip on its lower end; and if the implement could be kept at its work and guided in its course, the gimlet screw at its point and the spiral above its cutting portion might be dispensed with, as the screw merely pulls the cutter into the work and the spiral guides the auger and elevates the chips. So the auger, deprived of these portions, becomes a rotary cutter by which straight or curved recesses of a definite width may be cut. Mortises for tenons are made with such an implement, and it is used also for many other similar purposes.

An adaptation of the circular saw is more peculiar than this. It is the cutting of a wide kerf with a thin saw; thus a saw of one-fourth of an inch thickness, or "set," cuts a score, or slot, of three-quarters of an inch or more. In appearance the saw is anything but mechanical, and at first thought the method is "sloppy" and foolish. But the result of the work is good. The effect is produced by placing a circular saw on an arbor somewhat smaller than the hole through the saw, and canting the saw to an angle by means of convex faced glands or flanges. When rotated the saw's periphery has a "wobbling" motion, so that twice in its revolution the saw cuts out of its true kerf on either side. It will be seen that if the quarter inch saw is set one-quarter of an inch out of truth on its side, it will cut one quarter of an inch on each side, making, with the primary thickness of the saw itself, a cutting width of three-quarters of an inch. This apparently crude method produces very satisfactory results. It might be supposed that such eccentricity of movement from side to side would leave very coarse score marks on each side of the cut, but the velocity of the saw's rotation compared with the feed insures perfectly clean work. One of the chief advantages of this method is that the score required to cut a wide kerf with a narrow saw by gradations is much less than to cut the full kerf at once with full wide cutters.

Drilling and Turning Glass.

Glass may be readily drilled by using a steel drill hardened, but not drawn at all, wet with spirits of turpentine. Run the drill fast and feed light. Grind the drill with a long point and plenty of clearance, and no difficulty will be experienced. The operation will be more speedy if the turpentine be saturated with camphor gum. With a hard tool thus lubricated glass can be drilled with small holes, say up to three sixteenths, about as rapidly as cast steel. A breast or row drill may be used, care being taken to hold the stock steady, so as not to break the drill.

To file glass, take a 12 inch mill file, single cut, and wet it with the above solution—turpentine saturated with camphor—and the work can be shaped as easily and almost as fast as if the material were brass.

To turn in a lathe, put a file in the tool-stock and wet with turpentine and camphor as before. To square up glass tubes, put them on a hard-wood mandrel, made by driving an iron rod with centers through a block of cherry, chestnut or soft maple, and use the flat of a single-cut file in the tool-post, wet as before. Run slow. Large holes may be rapidly cut by a tube-shaped steel tool, cut like a file on the angular surface, or with fine teeth, after the manner of a rose bit; great care, being necessary, of course, to hack up the glass fairly with lead plates or otherwise, to prevent breakage from unequal pressure. This tool does not require an extremely fast motion. Lubricated as before, neat jobs of boring and fitting glass may be made by these simple means. The whole secret is in good high steel worked low, tempered high, and wet with turpentine standing on camphor.—*American Manufacturer.*

How to Tell Good from Bad Gilding.

It may be ascertained whether gilding is genuine or not by the fact that on the latter a weak solution of protochloride of copper produces a black precipitate, which it does not on the former. In the case of gilt paper, the simplest method consists in slowly burning the paper in a bright flame that gives out no smoke; in the incinerated remains of good gilt paper there are traces of the gold left behind, which are quite perceptible to the naked eye, in the shape of glittering spots while base metal on paper oxidizes in burning, and leaves nothing but a lot of red spots behind. This method, however, is scarcely accurate enough; a very much safer test is to be found in the use of mercury, either in metallic shape or in solution of salts of mercury. The former test is performed by putting a few drops of pure quicksilver on the gilt article, and either rubbing it in or slightly heating it. If the gilding be genuine, though ever so thin, the mercury combines itself with it, producing white spots on the surface. This does not occur in the case of sham gilding, and in rubbing mercury in no change of color whatever can be noticed. Another test consists in the application of a watery solution of nitrate of mercury. In this case the exact opposite takes place as in the former,

for genuine gilding remains intact, while a "dummy" at once takes a white color when brought in contact with the precipitate of mercury.

A NEW METHOD OF FINISHING WOOD-WORK: Many processes have of late been applied to the finishing of wood-work, such as staining in various colors, fumigating and other methods. A new finish is now cultivated in the Continental market, and is known as the Kubeuick process. It is used for giving a metallic surface to wood, and consists in first immersing the wood in a bath of caustic alkaline lye, in which it is allowed to remain for two or three days, according to the degree of permeability of the wood, at a temperature of 167° to 194° F. From this bath the wood passes to another of hydro-sulphate of calcium, to which is added, after 24 or 36 hours, a concentrated solution of sulphur. Here it remains for about 48 hours at a temperature of 95° to 122° F., and, lastly, for from 30 to 50 hours the wood is immersed in a solution of acetate of lead at the same temperature. The timber thus pickled is allowed to dry, when it is said to be susceptible, after burnishing, of a high polish and even metallic luster, which is more brilliant if the surfaces of the wood have been previously rubbed with lead, tin or zinc plates, and then polished with a glass or porcelain burnisher. Treated in this way the wood may assume the appearance of a metallic mirror, being also hard and very strong.

AN EXPLOSIVE MADE FROM COAL TAR.—German ingenuity has produced another derivative from coal tar in the shape of an explosive for mining purposes or fire-arms. This resultant is a mixture of saltpeter, chlorate of potash and a solid hydrocarbon, the latter being paraffine, asphaltum or pitch. The solid ingredients are powdered and intimately mixed, and the mass is then treated with a liquid volatile hydrocarbon, such as benzine or gasoline, which dissolves the solid hydrocarbon and forms the whole into a plastic body. This cake is then rolled into sheets and hardened by allowing the liquid solvent to evaporate, the product being afterward broken up into grains of any desired size, like ordinary gunpowder. By this method of dissolving the hydrocarbon before or after admixture with the salts, the grains become coated after drying with a water-proof surface or varnish. The new compound is only an explosive when confined in a close space. It possesses the same density as gunpowder, and is very hard.

GLYCERINE OR WHETSTONES.—Instead of oil, which thickens and makes whetstones dirty, a mixture of glycerine and alcohol issued by many. The proportions of the mixture vary according to the instrument operated upon. An article with a large surface, a razor, for instance, sharpens best with a limpid liquid, as three parts of glycerine to one of alcohol.

GOOD HEALTH.

A New Food.

M. Moride has introduced a new kind of food to the French Academy. It is prepared by working into a pulp raw meat previously deprived of bone and tendon, and then mixing this with bread or farinaceous substances, which absorb the watery constituents of the meat and thus form a paste. This paste is dried in air or a mild stove, and then ground and sifted. The powder is gray or yellowish, according to the material and proportions, and is said to have an agreeable flavor. By mixing this with albumen, fats or gummed water, it is made into cakes or cylinders, to be afterward used for soups, sauces, etc. It will keep for an indefinite length of time when thus prepared, provided it is not moistened. M. Moride affirms that this is more assimilable than cooked meat. He gives it the name of "Nutricine," and proposes, among other applications of his invention, to preserve the refuse of the slaughter houses, the flesh of horses, blood, etc., for the feeding of dogs, pigs, ducks and fowls. In this he is anticipated by the English manufacturers of the "meat biscuits" that have long been used for feeding dogs, fowls, etc.

If the materials could be guaranteed, this mode of combining flour with meat to produce a portable, unchanging, nutritious food, requiring the minimum of cooking, would be of incalculable utility, especially if the act of union of the meat with the farinaceous matter effects an incipient decomposition or loosening of the original bonds of chemical union that renders the compound more easy of digestion and assimilation than were either of the original materials. M. Moride seems to suppose that something of this kind occurs, and there are good analogies in support of such a theory. The soldier, the sailor or the workman away from home, or the clerk or merchant at his office, might thus carry a penny cylinder, which, merely moistened with a little hot water, would include all the material of soup, entree, joint, vegetables, bread and cheese.

CAUTION TO FAT PEOPLE.—The following "Caution to Fat Men," from the *St. James Gazette*, is going the rounds of the press: "Fat men resolutely bent on bringing down their weight should read the report of Dr. Vulpian, on the causes of the digestive disturbance

which was the origin of the malady to which the Comte de Chambord succumbed. The Count, it must be remembered, was, in his early days, thrown from a horse, with the twofold result of laming him and destroying his nerve. He was unable in consequence either to walk or to ride; and, having exhibited a taste and even a passion for hunting, he caused rides to be cut in the forest of Frohsdorf, along which, driven in a carriage, he was accustomed to pursue his game. This, during the last few years of his life, was the only form in which he took exercise, and as a natural consequence, he became inordinately stout. He had recourse to Bantingism, and the dietary system he adopted had the effect—as he first and Dr. Vulpian afterward believed—of bringing about the condition of stomach which at last killed him. 'Some four or five years ago,' says Dr. Vulpian's report, 'the Count, urged by a desire to diminish his stoutness, submitted himself to the Banting system in all its rigor, and in a few months had lost nearly fifty pounds of his weight. This rapid emaciation had produced weakness and at the same time perhaps digestive troubles, and several people have told me that that was the case, and have even traced to the same date the first attack of the malady.' The immediate effects of severe Bantingism seemed to have passed off, but later on the Count was twice attacked by acute indigestion, and was obliged to subject himself to severe treatment on each occasion."

THE VALUE OF SUGAR AS AN ARTICLE OF DIET.—Dutroche calls sugar the "most perfect alimentary substance in Nature." Dr. Rush says sugar affords the greatest quantity of nourishment in a given quantity of matter of any substance in nature. Sir John Pringle tells us that the plague has never been known to visit any country where sugar composed a material part of diet of the inhabitants. Dr. Cullen is of the opinion that the frequency of malignant fevers of all kinds has been lessened by the use of sugar. The celebrated Tronchena recommended sweetened water for almost every malady. Dr. Frothergill was very anxious that the price of sugar should be so far reduced as to make it accessible to the common people. Dr. Franklin had taken large quantities of blackberry jam for relief from pains of the stone, but discovered at length that the sanitary property resided wholly in the sugar. Sugar has been found to be an antidote to the poison of verdigris, if taken speedily and in abundance. It has been said that sugar injures the teeth, but this opinion does not deserve a serious reflection. The plentiful use of sugar is one of the best preventives of intestinal diseases in children. Nature seems to have implanted a love for this aliment in young people, as if it were on purpose to defend them from such disorders.

MORE AIR.—Those who have been housed for the winter, scarcely securing a breath of pure air for months, should, at its close, breathe as much of the spring air as possible, as one of the most important means of purifying the blood. All nature is active in the spring—vitalized, putting on new life and more graceful attire; and it is the privilege of debilitated women, nearly worn out housekeepers, the victims of "nervous prostration"—a new disease, or one with a fashionable name, meaning something or nothing—it is the right of all such to rally with the return of spring, and to do so by breathing more of God's pure air—free to all creatures, and as life-giving as free! These exhausted women have a right to throw off some of the drudgery of kitchen toils—some if not much of this is needless—and enjoy the air and sun, while managng a flower-garden. Women have "rights," and among them is that of taking better care of their health, which implies a little more leisure, less of the burdens, cares and anxieties of domestic life. This she can have by the adoption of plain, simple and sensible habits of living and dress.—*City and Country.*

A CURE FOR DRUNKENNESS.—There is a prescription in use in England for the cure of drunkenness, by which thousands are said to have been enabled to recover themselves. The receipt came into notoriety by the efforts of Mr. John Vieve Hall, commander of the *Great Eastern* steamship. He had fallen into such habitual drunkenness that his most earnest efforts to reclaim himself proved unavailing. At last he sought the advice of an eminent physician, which he followed faithfully for several months, and at the end of that time he had lost all desire for liquor, although he had been for many years led captive by a most debasing appetite. The recipe, which he afterwards published, and by which so many other drunkards have been assisted to reform, is as follows: Sulphate of iron, 20 grains; magnesia, 40 grains; peppermint, 44 grains; spirits of nutmeg, 4 drams. Dose, one tablespoonful twice a day.

LIMBS OF UNEQUAL LENGTH.—A writer in *Nature*, a member of the Royal College of Surgeons, mentions that, of 70 well authenticated skeletons he examined, the lower limbs were equal in length in only 7 instances, the right limb being lower in 23, and the left limb in 38 cases. It is claimed that this will have the effect, where persons walk without knowing the direction from their surroundings, to make their step longer with one limb than the other, and thus travel in a circle, as people so frequently do when they get lost. In most of the skeletons above referred to the right arm was longer than the left.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Alpine.

LEAD AND SILVER.—Monitor *Argus*, March 15: J. P. Ray is reported to have developed some very rich feeders, bearing lead and silver, in the Last Resort. From developments made recently in the mines about Monitor, we have every reason to believe that some time in future some rich strikes will be made in lead and silver ores.

Amador.

ST. JULIAN.—Amador *Ledger*, March 22: We paid a visit to this quartz mine at Middle Bar on Saturday. The one stamp mill had just been started on a mixture of quartz and slate. It is not expected that this matter will pay anything big, but it is run through as a test to get the mill in good working order before the rich ore which they have stowed away in the tunnel is crushed. The stamp is 300 pounds in weight, and is calculated to reduce three tons per day. We entered the tunnel, the mouth of which is but a few yards from the mill. The entrance was strongly barricaded, and is always kept so when rock is not being run out. The tunnel is about 200 ft in and runs almost due north. At a point about 40 or 50 ft from the face we reached the place where the pocket of rich ore was taken out recently. The eastern wall of the tunnel showed numerous stringers of quartz from one to three inches wide, all going down with a strong easterly dip. This wall was still sprinkled with rich black ore; also the roof, and especially the floor, the latter fact leading to the conclusion that the heart of the pocket, if it has not already been taken out in excavating the tunnel, lies below rather than above the present level. From this point small veins of white and apparently barren quartz are seen on the east wall to the face. Here the vein widens to a foot or 18 inches, and plentifully freighted with sulphurets of a yellow color. Free gold is occasionally met with in the quartz taken from the face, and the hope is entertained from the indications that another pocket is not far off. All the rich ore was crushed by Tuesday night. There were about 40 sacks of it. It is impossible to tell at present how much it realized, as much of the gold is mixed with sulphurets taken from the battery and boxes, and will have to be separated by chlorination. The yield is roughly estimated from \$5,000 to \$8,000—not a bad result from three days' work with one stamp. The Middle Bar tunnel is in 700 ft, and runs through hard rock the entire distance. No timbering has been needed so far. A blower has been ordered for the purpose of driving back the smoke, as the men find it impossible to work at the head for an hour or more after each blast.

SUTTER CREEK.—Operations at the Mahoney are progressing very slowly. Mr. Morgan has got a few men employed, who are engaged principally in endeavoring to take the water out. This is a serious job, as the water has arisen nearly 400 ft, drowning one pump. The flow is so strong that very little headway is made in controlling it.

Calaveras.

ANOTHER RICH STRIKE AT SHEEP RANCH.—Calaveras *Prospect*, March 21: The town of Sheep Ranch, during the past few weeks, has been involved in an unlimited excitement, over the discovery of the famous vein at the northwest extension of the claim recorded to J. B. Hagin & Co. After the prospecting by the original locators of the claim, the property laid in idleness for several years. Recently Mr. Clary conceived the idea that by running a crosscut tunnel there would be a possibility of making a paying discovery. An Italian—Sebastian Gardella by name—was employed to do the work. Mr. Gardella is an experienced prospector and his opinions at the beginning of the work were, that the famous lode would be found and that he would claim the honors of discovery. He worked several weeks, running the tunnel during this period a distance of about 25 ft but failed to make an encouraging result. He was then ordered to suspend, but being confident of success he told his employers that he would work on and if he failed to make a discovery he asked no recompense. He then proceeded a distance of perhaps 10 ft and made the discovery of an excellent opening. He followed this for several days and began taking out some of the richest and most promising ore that has ever been seen in this section. Undoubtedly this is the extension of the quartz vein celebrated everywhere as the Sheep Ranch mine. Indications are favorable in every respect, for the development of a mine rich to an extreme, which would make the village of Sheep Ranch a revived and lively place. Perhaps in the future, that neighborhood may wear laurels and become celebrated as a second Virginia City in mineral riches.

WEST POINT.—Cor. Calaveras *Chronicle*, March 22: The San Antonio mine which was being worked by Messrs. Hunter & Clark has been closed down. The Scorpion has commenced work this week. The Wide West mine owned by H. Sterling is still being worked. Messrs. Easton & Hait, the latter being somewhat interested in the Scorpion mine are now in town.

El Dorado.

GREENWOOD.—Mountain *Democrat*, March 22: A movement is now being made in mining matters here which promises a relief from the long-continued dull times of which we have all, not without reason, been complaining. Profitable work is being done on the American Seabelt mine. This mine is owned by the Smith Bros. It is situated in American canyon, and is one of the oldest locations. It has turned out a large amount of gold in the past, and from present prospects appears to be as valuable a mine as ever. At the Spanish mine, owned by M. M. Howe, a strike has recently been made, and some parties have made arrangements with Mr. Howe so that they can work it for a term on a percentage. Some Chinamen have purchased Mr. Peterson's claim in Graveyard ravine, and are working it steadily. The Revenge Seabelt mine in Coloma canyon is being prospected by the owners with very flattering results. They are now surveying for a ditch to bring water from the El Dorado Water Co.'s canal, and contemplate putting up a quartz mill. Messrs. Hulford and Bleibtreu are busy

sluicing at the old Cederberg. A. W. Martin is at work at the adjoining mine called the New El Dorado. The want of water has retarded other mining operations in this district, which really possesses a mineral wealth that should make dull times an unknown quantity in it. Dr. Russell, of San Francisco, who has recently been testing ore from the Morrell Con. mine, with results that have astonished even the owners, has been on a visit to Greenwood, preparatory, we hope, to the introduction of his process by the erection of a furnace and works in this district. I believe the Doctor was very favorably impressed with our mining outlook. Another seabelt mine—the New Garibaldi—owned by Messrs. Ricci and Hannery, has also been brought into the line of working mines.

Mariposa.

A MINE SOLD.—Mariposa *Herald*, March 21: Last Saturday the Morning Star mine on Bear valley mountain, was bonded by its owner, Phillip Gosser, to a Mr. Rogers, of San Francisco. Two thousand dollars was paid down, and \$7,000 will be paid in six months, and \$7,000 more in twelve months. The purchase means business, and active work will begin at once. The sale was effected by James Dolan, Esq., formerly a prominent citizen of this county. E. O. Darling, Esq., has returned from San Francisco, and will take a prominent position in managing the affairs for the new owner of the mine. We congratulate Bear valley and the county on this fresh introduction of capital and enterprise.

HITE'S COVE.—G. W. Barley, representative of the Hite Gold Quartz Co., came to town last Sunday. Mr. Barley speaks enthusiastically of the future in store for mining interests in Hite's Cove and vicinity.

HORNITOS.—John Ellen, an old miner, picked up a boulder weighing 21½ pounds on his gravel claim in the vicinity of Mr. Henry Morrison's old place, now owned by Stockton & Buffum, and sold it to-day, just as he found it, for \$500 to Bernard Vriberne, of Indian gulch. Mr. Vriberne refuses \$1,000 for the rock now. He will take it to Europe. Rafael Farrias picked up a nugget last week which weighed \$44. John McColloch, an old resident and miner, and a former owner of the Brooks mine, is in town. He says things have changed since he left here twelve years ago.

Mono.

A DRAFT.—Free Press, March 19: Quite a force of miners was drafted from the Standard mine yesterday, resulting in considerable excitement. The engineers and brakemen were put on twelve hour shifts instead of eight-hour shifts. It is the intention to shut down the Standard-Bulwer mine in a day or two. This is the result of a marked falling off in the value of the ore. The old Standard mine will be kept steadily running as usual, and at the same time prospecting work will be kept up in the mine. The latter is likely to result in new discoveries most any time. Many feared the draft would result disastrously to other stocks than the Standard, but such did not prove to be the case. There is no reason why Bodie, Bulwer or Mono should be affected by the Standard, as each mine depends upon its individual value. Bodie was looking well yesterday, and although a considerable amount of stock was sold from here it did not fall off except to a comparatively small amount.

Nevada.

DITCHES BEING REPAIRED.—Nevada *Transcript*, March 19: All the ditches in the upper part of the county are being put in good condition but no water from there is being used for hydraulic purposes. The work now being done gives employment to quite a number of men. The water companies intend to keep their property in good condition, as Sawyer's decision may be reversed, or something else may take place whereby the waters can be utilized.

MAGENTA MINE.—Greenville *Union*, March 23: The Magenta Mining Company has levied a small assessment. This was found necessary from the fact that the Co. has been at work for six months in the work of development, and the working fund raised from the sale of stock is about exhausted. There have also been some unanticipated expenses, as the cutting of a heavy stream of water on the 400 level made it necessary to put in a larger pump, and a special engine had also to be provided for hoisting purposes. The heavy body of water to contend with has prevented the opening of the 400 level, but the work has been carried forward on the 300 level, and from the north drift and the stopes above rich rock have recently been taken out. A crushing of rock from this level is now going through the Rocky Bar mill. Another lot of specimens were taken out of the 300 level on Friday, and yesterday a number of loads of fine ore were hoisted from the same. The ravine under which the lead dips has recently been flumed to carry off the surface water, and within the next ten days it is expected that the mine will be pumped dry to the bottom, when drifting on the 400 level will be resumed.

THE NORTH STAR.—Foothill *Tidings*, March 21: Steps are now being taken toward re-incorporating the North Star Mining Co. A Board of Trustees will be elected and will contain two or three members from Grass valley. It will be known in about a week hence if the negotiations pending with the Scotia Co. are to be successful. If not, the present owners must, to fulfill their agreement with the present subscribers, furnish hoisting works, machinery, etc. The gentlemen inform us that just as soon as the small balance of stock is subscribed, work will go ahead. Unless the company have \$40,000 cash subscribed for the sole purpose of re-opening the mine, they will not feel justified in proceeding, as with that amount stockholders need have no fear of assessments.

RUMORED FIND.—Foothill *Tidings*, March 21: There are a great many persons constantly prospecting on Deadman's flat, near Grass valley. This particular place has become noted for its rich deposits, and many a "pocket" has been unearthed on that famous flat. Rumor comes to town to-day that Thomas Scadden and several other young men ran into a pocket containing \$2,000 several days since, on Deadman's flat, and from the looks of the decomposed quartz there is a probability of a strike of a few thousand more.

Plumas.

GETTING READY.—Greenville *Bulletin*, March 16: A crew of men were put to work in the Arcadian mill the first of the week, getting ready for a start. It is expected that the mill will be started up about

the end of the week, as the ditch is now nearly ready for having the water turned in. All through the winter a number of men were at work in the mine, and now a large body of ore is opened up, and no doubt the proprietors will have a profitable season.

RIVERDALE.—Plumas *National*, March 18: The new machinery has been put in place, and work resumed in the Riverdale mine. The engine started up on Thursday, and is steadily lowering the water in the mine, which should be clear in a day or two. The delay has been tedious, and expensive to the owners, but they are now in hopes that everything will work favorably and if such is the case they will soon be taking out big pay.

Sierra.

THE COLUMBO MINE.—Sierra *Tribune*, March 21: In the upper level of this mine the ledge is five ft in width, and a splendid body of ore is presented to view. In the lower tunnel indications are very fair for tapping the ledge at an early date. Finer screens have been put in the mill recently, and they give much better satisfaction than those formerly in use. Last week a change was made in the superintendency of the mine, Mr. Deidesheimer being superseded in that capacity by W. H. Rodda. Mr. Rodda is an old and experienced miner. At one time he was in charge of the North Star mine at Grass valley. For the past four years he has been superintending the Summer mine in Kern county, having an eighty-stamp mill and one of the most extensive mines in the State. It was formerly the property of Senator Jones, of Nevada, but is now owned by Michaels, Friedlander & Co. Mr. Rodda is highly pleased with the present condition of the Columbo mine and its future outlook. Mr. Deidesheimer intends remaining in this vicinity, and will devote his energies toward opening up other mines in the district. Stephen Moore, who has been acting as foreman at the mine has accepted the superintendency of a mine in Tuolumne county, and will go there as soon as a suitable man can be secured to take his place. W. H. Gandy, of Trenton, N. J., a trustee, arrived at the mine last week, and will probably remain a couple of months.

Siskiyou.

THE BIG DITCH.—Yreka *Union*, March 20: The Portuguese miners of this vicinity and Hawkinsville are endeavoring to lease the Big Ditch of Mr. Edson upon the following terms: They are to clean out and repair the old ditch running on the west side of Yreka, repair or put in new flumes where needed, Mr. Edson to furnish the lumber and nails therefor, and the Portuguese to have a lease of said ditch from Willow creek down for a term of three years, and to pay \$250 per month for the water therefrom. The Portuguese estimate that it will cost about \$3,000 to put the ditch in repair, and as a remuneration for their labor and outlay, they ask that Mr. Edson allow them a rebate of \$1,000 per annum from their rents. Upon coming to town Tuesday we learn that Mr. Edson made a proposition to sell them the above-named portion of the ditch at a stipulated price, but we have been unable to learn which of the two propositions will be entertained. The lessors, at the expiration of the three years' lease, have the privilege of renewing the lease.

SAWYER'S BAR.—Messrs. J. B. Tonkin and Jas. R. Hughes have surveyed the grade for a ditch and flume to carry water on to the Ophir placer mine, situated on the south side of the river and above the mouth of White's gulch. The company mean business, and will proceed to work with a full force as soon as the weather becomes warmer and the snow melts away from a portion of the proposed grade. I hear the parties obtained a good prospect on the ground, sufficient to justify them in the undertaking. There are other bars below them which their water will command. The proprietors of the Uncle Sam are fretting. Cause—no water and an eight-stamp mill and plenty of rock. They propose, the coming season, to put an engine on the works, which will give them at least ten months' run. Their mine is considered valuable and well worth the outlay. Jimmy Kean has commenced operations on the Evening Star mine, of which he is the sole owner. He is well posted on the auriferous character of that vicinity, and will, no doubt, make it pay. That the mining outlook of the Salmon country is better now than for the last few years is the opinion of those who ought to know.

NEVADA.

AMONG THE MINES.—Eureka *Sentinel*, March 20: The Mildred mine, Secret canyon, has been leased for a term of six months. The prospect is still very encouraging in the Page & Corwin mine, Secret canyon. Tributaries are taking out quartz for flux from the Katie Ryland mine on Coy Hill. Adams Hill mines are again looking up and producing some ore of very high grade. Capt. Tuller has struck a little bonanza in the Paul Pry mine on Adams Hill, and will increase his working force of men. The Kit Carson hoisting works, which have been idle for more than a year, are crushed in with snow and partially buried. There is some very good ore being extracted from the Red Rose mine, Pinto district, which is being worked under lease. Ruby Hill miners are becoming alive to the fact that they can get good pitches in the outside mines as well as right at their own doors. Ten tons of ore were hoisted from the Silver Connor mine on Monday last, which sampled \$80 per ton, \$62 of the value being in gold. This would be a good time for the formation of local companies to work mines on a cheap assessment plan, and there are mines out of number in Eureka district that would pay such companies to look after. Would it not pay some one to get the old Roslin furnace dump to work on tribute? When that furnace was running the knowledge of smelting ores in this district was very imperfect, and it is reasonable to suppose that the dump would pay to work over. The Hamburg mine is being worked entirely by tributaries, and is yielding a large amount of ore daily. The mines in Goodwin and New York canyons, as a general thing, are looking better than for several years past. The Bald Eagle mine is yielding some very rich ore from around the old stopes. It is being worked by two men under lease. The Helena Mortimer mine is being worked by tributaries, who would not sell their patch for a trifle. It is producing better ore than for several years past. The Home Ticket mine, also worked on tribute, is producing handsomely, and one shipment of from 10 to 15 tons is being made daily. There are also tributaries, doing well in

the old Dunderberg. The Uncle Sam is being prospected from the surface, near New York canyon, at a place from which some high grade ore was taken several years ago, and the prospect is now quite encouraging. The Connolly mine, which is in a prospecting condition at present, is looking exceedingly healthy for ore in two or three places. Some ore is being extracted from the 70 level by tributaries, and during the summer it is thought that considerable activity will prevail. The Clipper mine, one of the locations of the Golden Rule Series, is being worked with good prospects, and some pay ore is in sight. A large amount of development work has been done in it since last June and it is capable of becoming one of the leading mines in that section of Eureka district. The Eureka Tunnel is being worked on a small scale; it is producing some very rich ore, but owing to financial embarrassment, the work of development is kept back, so that nothing definite can be said with regard to the future of the property. It is an important feature of the mine that tributaries are at work on the bottom level, driving towards the carbonate vein. The ground looks favorable for ore. The mine is at present in the hands of the syndicate who bought up the liens. The ore that has been accumulating on the dump since the heavy snow storms set in is now being shipped to the furnaces.

Washoe District.

SAVAGE.—Virginia *Enterprise*, March 22: The flow of water cut in the north drift on the 2600 level appears to be decreasing somewhat. In case it does not run out in due time, this water may eventually be shut back by means of a bulkhead placed across the drift. It is giving no trouble, and the only disadvantage resulting from tapping it is the cost of pumping it from the 2600 level to the Sutro tunnel.

MEXICAN.—The west crosscut on the 3100 level is out about 25 ft. The material is vein porphyry, with occasional small seams of quartz and clay.

SIERRA NEVADA.—The northeast drift on the 3700 level is still being pushed ahead. The material is unchanged. The fan station on the 2900 level, joint with Mexican and Union Con., is completed, and the fan is in and at work. As yet no prospecting is being done above the 3100 level.

UNION CON.—The fan station on the 2000 level, joint with Sierra Nevada and Mexican, is finished, and the fan is in place and running. On the 3100 level the diamond drill has been placed in east crosscut No. 3, and they are now drilling east into the wet belt.

ALTA.—The ground in the face of the east drift on the 2150 level, is working fairly well.

GOULD AND CURRY.—Good progress is making in the work of cutting out a station at the 2700 level, though the heat is very great.

BEST AND BELCHER.—Are cutting out a station on the 2700 level at the bottom of the joint Gould and Curry winze. When this station is finished a drift will be started. It is very hot at the bottom of the winze. The rock is birdseye porphyry.

CON. VIRGINIA.—The enlarging of the 2700 station has been completed, and the double hoisting engine put in place. Guides are now being put into the joint California winze from the 2700 down to the 2900 level.

HALE AND NORCROSS.—The southeast drift is making excellent progress. It is being pushed as rapidly as possible to the point where it will connect with the west drift from the Combination shaft.

UTAH.—The northeast drift on the 1750 level is out about 390 ft. It is still in porphyry containing seams of clay and streaks of quartz of a favorable appearance.

ANDES.—The appearance of the material found in the prospecting drifts is favorable, and about the usual quantity of low-grade ore is being extracted.

CROWN POINT.—The old upper levels still continue to yield well, and sufficient ore is being extracted to keep the river mills going steadily.

IMPERIAL.—Are drifting north and south on the old 600 level, where some favorable prospects are being obtained.

OPHIR.—Are still extracting ore from the 150 and 250 levels. The exploring drifts and winze (below the 250 level) are making the usual progress.

YELLOW JACKET.—Sufficient ore is being taken out to keep the mills on the Carson river running to their full capacity.

BELCHER.—The usual quantity of ore is being extracted and sent to the mills on the river for reduction.

COMBINATION SHAFT.—A station is being opened at the 2800 level, from which will be run a main west drift.

Belmont District.

PROSPECTORS WAITING.—Courier March 15: Several prospectors in this town are impatiently waiting for the snow to melt from the surrounding hills. They are anxious to search for mines of gold and silver, as they feel confident that rich mines exist in this section.

BELMONT.—Work in the Belmont mine is progressing as usual, and good ore is encountered on the 200 south level.

Cherry Creek District

STRIKE IN THE TICUP.—White Pine *News*, March 15: In the fore part of the week an important strike was made in the lower level of the Ticup mine by the force now working there for Spencer & Frank. The extent of the ore body is not yet known, but the quality is of high grade—over \$200 to the ton. After the heavy losses this firm has sustained by the late owners of this property, it would afford us pleasure to record a find of such extent as to more than repay them. We hope soon to chronicle such a result.

Eureka District.

THE SILVER CONNOR.—Eureka *Sentinel*, March 18: This mine is being worked at good profit, from 8 to 10 tons of \$100 ore being hoisted every third day. From a deposit recently opened, bright yellow carbonates, W. H. Stowell assayed an average specimen yesterday which went \$1,217.20—\$950.00 in gold and \$266.30 in silver. This body, which is yet undeveloped, and the extent of which, consequently, is not known, was struck at a depth of 300 ft in a winze from the 250 level. Considerable of the aver-

age value named—\$100 per ton—will be on the dump ready for shipment when the roads get better. The Silver Connor is a good paying property and improves with development. It does not seem unlikely that it will yet prove to be a mine of veritable bonanza.

LOCAL NOTES.—It would be singular, with the vast amount of prospecting in a large number of mines in Eureka district, this spring and summer, if some important and extensive developments are not made. M. McGarry has taken out of the Banner and has on the dump about 14 tons of \$150 ore. He is now following the vein which yields this ore on the 300 level. He will begin shipping as soon as the trails and roads are open. The news from a number of mines in the neighborhood of Eureka is better and better from day to day. We confidently anticipate quite a revival of mining in these outside properties within the next two or three months. We hear indirectly from an authentic source that several of the tubulars in the Richmond mine have splendid pitches, and that the mine generally is looking unusually well. It is intimated that something big may be expected before long. This is certainly what everybody hopes for. Everybody interested in the town of Eureka and the future of this mining district is anxious to know what the programme of the Eureka Con. Mining Company is to be. It will make a vast difference to that company and to everybody else in these regions whether or not they prospect their lower levels through the new shaft. It now seems likely that, whether or not the big mines on Ruby Hill resume their wonted life and activity, this summer, the numerous small outside mines may be depended upon for a large quantity of ore for reduction at the furnaces. The proved value of these numerous "outsiders" will be very encouraging, and may, perhaps, warm the blood in the big "insiders." It is perhaps of no ultimate disadvantage to Eureka Mining district that the leading mines on Ruby Hill have so greatly reduced the number of men employed on day's pay, for very many of these have been thus driven to the hills to prospect. These men have leased mines and are tributary in all directions in the outside mines, and in not a few instances have made promising developments.

EUREKA TUNNEL SITUATION.—Eureka Sentinel, March 21: Yesterday Lawrence Hartnett, having signified his intention to attach the real and personal property of the Eureka Tunnel Mining Co. to satisfy his judgment of \$15,000, the Sheriff was served with a notice by the purchasers of the liens, that they held the personal property and that they would hold him responsible for interference therewith.

Gold Run District.

EXAMINING MINES.—Silver-States, March 21: Some mining experts from Lander county are examining mines in Gold Run district, near Golconda.

Jefferson District.

CORA D.—Belmont Courier, March 15: We have seen a very fine specimen of ore recently taken from the Cora D. mine at Jefferson. It is by far the finest piece of ore ever extracted from any of the mines of that district. This ore carries gold and silver.

Mount Cory District.

THE FIRST BULLION SHIPMENT.—Walker Lake Bulletin, March 19: The event so eagerly and anxiously looked for has taken place. The Mount Cory Mining Co. has made its first bullion shipment. Last Saturday night Supt. McKenzie turned over to Wells, Fargo & Co., for shipment to San Francisco, fourteen bars of silver and gold bullion, weighing 1,740.85 pounds, and valued at \$20,729.90. When the fact is taken into consideration that the work so far done at the mill has mainly been experimenting and adjusting the numerous pieces of machinery, the shipment is a large one, and the parties immediately interested are justified in feeling satisfied with the result. Everything is now in fine condition, and there will be no more delays other than those of a nature to be expected in so large a mill. From this time on regular shipments will be made. The bullion is 800 fine, thus proving beyond a doubt that the leaching process is the best that could have been adopted, as it was predicted that, on account of the character of the ore, it would not be possible to get it more than 600 fine. The mine is looking well, and new developments of ore are continually being made. The base slag, consisting of copper and lead, and carrying silver, will be allowed to accumulate at the mill until there is enough to make a car load, and no shipment of less than that amount will be made. Upon the arrival of Supt. McKenzie at the express office to attend to the shipping of the bullion, S. A. Knapp, Wells, Fargo & Co.'s agent, opened a supply of Roderer, and many toasts to the mine, the mill, Mr. McKenzie, and every one concerned in the successful outcome of the company's well-directed pluck and energy. While the effect upon the financial affairs of the county will not be immediately felt, it will not be long before this will be one of the best, if not the best county in the State. Aside from the increased revenue from the bullion tax, it will enhance the value of property for taxable purposes all over this section, and encourage the work of development in many more mines that are now showing better prospect than did the Mount Cory three years ago.

Sacramento District.

HUMBOLDT QUEEN MINE.—Silver-States, March 21: J. W. Mills intends to ship several hundred tons of ore from the Humboldt Queen mine in Sacramento district, to Denver to be reduced. Alex. Wise's teams are now engaged hauling the ore from the mine to Rye Patch station, where it will be loaded on the cars.

Safford District.

NOT LIVELY.—Cor. Eureka Sentinel, March 21: Things are not very lively here just at present. Howes & Doherty are pushing the Onongada tunnel day and night. They are in now about 320 ft, and expect to run fully 50 or 60 ft further before striking the ledge. The Shield Bros. (Tom and Dan) are still extracting some good ore from the Gen. Shields. A tunnel has been run on the ledge a distance of 20 or 30 ft, and a shaft sunk 30 ft showing a well defined footwall and a ledge of ore varying from a foot to two or three ft in width. The high grade ore is identical in character with the Onongada ore, and assays \$260 per ton in silver. William Slaven, the present owner of the Key West mine, is trying to do something in the way of development in that quarter.

Taylor District.

STARTED.—White Pine News, March 15: The

new monitor which is completed, and has been started in to hoist rock. It is working in good shape, under the skillful management of Sam Snyder. A snug and comfortable building has been put over the works. Some workmen are coming from the outside already in anticipation of work being resumed on the Monitor mines in a short time.

Tuscarora District.

CONFLICTING CLAIMS.—Times-Review, March 18: There was considerable excitement in the vicinity of the Paymaster claim yesterday. It was discovered that about 1,000 ft of ground adjoining the Paymaster, which was supposed to have been covered by a prior location, was vacant. The ground was located by two different parties, and appearances indicate that title to the property will have to be established by litigation. Both parties are at work on the ground to-day at points but a short distance apart. The recent development in the Paymaster has created quite a prospecting fever in that vicinity.

NAVJO.—Times-Review, March 20: Since last report have resumed milling and work at all points in the mine.

ELKO CON.—North drift, 200-foot level, on west ledge has been extended 15 ft since last report. South drift 5 ft. It has improved both in width and character of lode materially in the past week.

GRAND PRIZE.—South crosscut, 200-foot level, extended 30 ft; total length, 153 ft. East drift on same level north lateral vein is in 18 ft in favorable vein material. West drift north lateral 300-foot level extended 13 ft. Upraise from south drift 400-foot level is carried up 31 ft. The vein looks favorable. Work has been resumed in south drift 300-foot level.

Ward District.

MILL.—Ward Kefler, March 15: The Argus mill will start up again as soon as the roads become passable. It is not a fact that the Silver Canyon mines would be driven on account of the damage done by the snowslide. Men have been put to work in the Osceola Company's mine. This don't look like abandoning the property.

White Pine District.

SILVER PLATE.—White Pine News, March 15: Mathewson Bros. are having work done upon the Silver Plate mine, below town, with quite encouraging prospects. They deserve much credit for several mining enterprises they have lately taken hold of. The Truckee mine is now being worked by day and night shifts.

A COMPANY THAT NEVER TIRES.—It is authoritatively announced that the Eberhardt Co. has decided to raise \$100,000 more to renew prospecting with burleigh drill on their Treasure Hill property. This is, we believe, the third they have raised of similar amounts. The Eberhardt people have pluck and perseverance of a high order, and the fates may yet degree a commensurate reward for their great exertions to uncover a bonanza in the Hill. How the pigmies who control our destinies, and one of the best mines in the State (the Star) sink into insignificance when compared with the men who manage the Eberhardt. The former are sneaking swindlers of the poor laborer—the latter, men of honesty, pluck, and perseverance. May they win.

ARIZONA.

MINING ECHOES.—Prescott Courier, March 15: The Groom creek mill is pulverizing gold-bearing quartz. Lynx creek is well manned by placer miners, most of whom are ground-sluicing. Copper Basin gravel, below C. C. Bean's copper field, is paying men \$3 a day. Copper Mountain smelter has made a successful run. Rich ore has been struck below the iron cap. Company will be reorganized, and push matters. Word comes from United Verde district to the effect that the Hampton mine is growing richer and bigger, and that two more 30-ton smelters will be put up in the spring.

McMILLEN NOTES.—Globe-Chronicle, March 20: The storm, which has been devastating the whole country for six weeks past, has not spared McMullen, as sixteen houses in different stages of demolition will attest; but as they were, with one exception, unoccupied, but little damage was sustained. At the mine, work is progressing as the limited supply of wood will admit. There are at present quite a number of Indians engaged in delivering wood and hay, the packing being mostly done by the squaws, who carry from 150 to 200 pounds with apparent ease. They are Lontos, and say that as soon as the rain is over they are going to the Cibicu to plant. The mill will again start up on the 12th inst., wind and weather permitting.

PECK.—Cor. Prescott Courier, March 14: The "burg" just now, presents quite a lively appearance to a stranger. It might be supposed that "old Peck" was a booming camp again, when the fact is that nearly everything has been at a standstill for several days past. More than a week ago the water coming down Wa. Eagle Gulch began seeping into the Peck mine faster than the hoisting works could take it out, and finally drove the miners out, and for five days only two engineers and two bucket tenders have been at work in the mine. The men were paid off as usual on the 5th inst., and are now taking a rest. The Tusconia mill was forced to stop Sunday for want of salt, and some of the mill men came to town. Ensign's burro train arrived via Big Bug Sunday evening with salt and groceries, so the mill will start again to-morrow, probably. For some reason, not publicly known, the Black Warrior Co., Sunday, discharged all hands but one or two. The steam hoist is getting the better of the water in the Peck, and the boys will be at work again in a few days. Evidently the Black Warrior Company have some change of operations in view, for they have recently bought the Lane & Woodsoa property, which is said to be a good mine, and talk of enlarging their mill. Men from the Silver Belt say that mine never was in a better condition for turning out ore, and the stoppage there will be only temporary. E. L. Gobin and others have re-located the Necessito claim, just below the Black Warrior mine, and are sinking on it and developing a lot of rich ore, the existence of which had not been suspected. Many assays show from 300 to 500 ozs. in silver, and some go up to 2,000 ozs. per ton in silver. Messrs. Gabel, St. Curtis and McWhorter, have discovered a big silver vein on Turkey Creek, about two miles below the Big Bug road. They have had assays of 400 ozs.

per ton. Have done but little work on account of the bad weather.

THE RICH STRIKE IN THE GROUND HOG.—Tomb Stone Epitaph, March 16: Superintendent Fisher yesterday brought in two samples of ore from the new strike in the Ground Hog. The pieces weigh 79 pounds, and carry that many dollars in silver, being rich carbonates and black metal. It comes from the face of the sixty-foot drift on the 150 level, the scene of the new strike. The ore, which can be seen at Priddyham, Macneil & Moore's, is as fine as anything ever found in the camp, and there is every indication of a large body. It is just such discoveries as this which make Tombstone's future an assured one. The main shaft of the Ground Hog is now down 200 ft, and altogether there are 800 ft of workings, which place it somewhat beyond the rank of a prospect. Not long ago the property was sold by the Schleiffel boys for \$5,000, and to-day the owners would laugh at an offer of \$100,000. It is owned principally in Pittsburg, Pa., Mr. Fisher having a large interest.

COLORADO.

IDAHO SPRING.—Gazette, March 13: Thirty-five men are to be employed on the Kitty Clyde mine. The last shipping from the Metropolitan mine was six tons of smelting ore. The Mountain King lode, in Cascade mining district, is being worked with good results. It is currently reported that the Mayflower mine will start up immediately. This is good news, as it is a pity to see valuable property that will pay closed down. Mr. Jackson is leasing on the Shafter mine and obtaining excellent ore. He is working in the old shaft, and has a pay streak of four inches that pays well. A distance of 38 ft has been reached in the adit at the east end of the Dorit lode, in Jackson mining district, and some very fine mineral is exhibited on the dump. The shipments from the Donaldson and Champion mines for February amounted to over 80 tons of smelting ore, besides mill dirt. Fifty tons of smelting and 30 tons of concentrating ore have been treated this week at the Mott Public Sampling works. On Wednesday a large shipment of ore was made from the Prigheimer's Friend, on Seaton mountain. The King Solomon mine is producing well. Mr. Moulton, of Denver, is the owner and feels encouraged.

A NEW MILL.—Colorado Miner, March 15: We learn from reliable authority, that the Grand Lake Mining and Milling Company, of Chicago and Quincy, Ill., has bought a large mill, to be put in at Gaskill. This company owns the Wolverine, one of the best developing mines in the State, and also one of the most valuable. There is now something over 2,000 tons of ore on the dump, that will mill-run about 100 ounces per ton. No stopping has yet been done, and in one place in the mine, where the main shaft was sunk to connect the upper and lower levels, a body of ore 30 ft in width was cut. The advent of this mill will insure the working of a great many mines, now lying idle for the want of a mill on the ground to treat their ores.

COLUMBIAN MOUNTAIN.—The mines on the mountain still continue to attract attention on account of the new developments and large resources of the true fissures. Recent development on the Joe Reynolds properties confirm more than ever the belief that this hill will yet disclose immense ore reserves of a high grade ore.

VULCAN.—We are glad to learn that this property is in a steadily remunerative condition. The best proof of the solidity of the mine is regular shipments of high grade ore which are made. During the month of February six tons of mineral, milling over 300 ounces silver per ton, were shipped from this property. This is considered doing well. In all the openings on the mine good paying ore is encountered.

THE GEORGETOWN TUNNEL.—Georgetown Courier, March 21: Mr. H. S. Beebe has organized a Co. of Denver capitalists for the purpose of driving a tunnel into Griffith mountain just below the Catholic Church. The Co. has bought the Leslie Norwood lode from Bunnell & Smith, upon which the tunnel is started. The Griffith and Sonora lodes have also been leased by the company. A car and track have been placed in the tunnel, and everything is now in readiness to push work ahead. The total length now projected will be 3,000 ft, which has been surveyed by Wheaton & Chase. It will cut the following localities at the distance stated: Griffith, 275 ft; Lafayette, 535 ft; Chicago, 575 ft; Lucky Dutchman, 600 ft; Star of the West, 995 ft; Cass County, 1,120 ft; Melbourne, 1,636 ft; Broad Gauge, 1,800 ft, and the Scottish Chief at 1,822 ft. Mr. Beebe has succeeded in interesting some heavy capitalists in this enterprise.

THE PAY ROCK TRAMWAY.—Excavating work for the piers of the Pay Rock tramway, from the mine to the mill, was begun last Saturday. It will be rapidly pushed until completed. According to contract it is to be finished and in operation by the first of May. The tramway is the Huson patent and is said to be the finest yet invented. It will be 2,181 ft long, and will have a capacity of carrying 60 tons every ten hours. Near the foot of the mountain the stations will be from 50 to 60 ft high. The tramway can be utilized in carrying coal, wood, etc., up to the mine, and will be so arranged as to carry passengers, who have the grit to take such a trip. This will be the sixth tramway built in Clear creek county.

IDAHO.

BAYHORSE.—Ketchum Keystone, March 15: Mr. Gilmer, of Gilmer & Salisbury came over from Bayhorse Monday. Through him we learn that the Ramshorn smelter will resume operation about the 18th. The delay in starting is explained by the fact that unexpected snow has retarded ore and bullion shipments as well as general transportation between Ketchum and Bayhorse. Mining and smelting operations in the Challis country promises to be unusually vigorous during the coming season and there is a probability of increased smelting capacity at Bayhorse. The mines are all preparing to do extensive and solid work, especially the Excelsior and Ramshorn. The entire transportation to and from that region, and in fact all its commercial traffic will have a direct influence over Wood river, and especially Ketchum, upon which point the Challis country is dependent, and by direct communication. Ketchum is the general starting point and supply depot for the entire country to the north and east.

MINING NUGGETS.—Six men are at work on the North Star mine. The Silver King mine is working

six men on development. The Elkhorn mine has 200 tons of ore at the Philadelphia smelters. Machinery for hoisting works for the Davitt and Silver King mines is now enroute. The Pride of Idaho will soon be tapped by a low tunnel about 200 ft below the surface. The Parker has recently been under the direct superintendence of Prof. Jenny. The Minnie Moore ships 35 tons of ore daily, and will soon increase that tonnage to 50. The Rebel claim, leased by W. A. Mensch, is developing mineral in profitable quantities. The Lion mine is destined to figure prominently among the properties of the Sawtooth region this season. The Vienna and Mountain King mines, at Vienna, still drive into the ore with vigor and keep the Vienna mill constantly in action. The Penobscot mine, near Bellevue, is being worked steadily for development, and a rich strike is reported to have been made recently. Reports from the Silver Star, on Big Smoky say that good ore is found wherever the vein is tapped. The snow there is about eight ft deep. The foreman will be at Ketchum soon. Nine mines out of every ten in the county are doing development work only, and this with only small crews. But most of them are acquiring a fine condition for extensive stoping in the spring. The Baltimore and Victoria mines are working light crews, but Mr. Hickey, the Supt., informs us that large bodies of ore have been developed and some unavailably extracted. Stoping will begin in real earnest about May 1st.

A GOOD RECORD.—Wood River Times, March 19: The Vienna mill is making a splendid record. Since it was started up, last July it has shipped 147 bars of fine bullion, worth an average of \$1,500 per bar, or a total of \$220,500 worth of bullion. This is a very good showing for the first eight months' run of the mill in a snow-bound country. This year the showing must, of course, be better still.

MONTANA.

GAGNON.—Inter-Mountain, March 21: The Gagnon mine has contributed to the total production of this district fully two million dollars since the time when a one-half interest in the property was transferred to Joe Rosenthal in payment of a \$30 board bill. Since then it has been in a state of almost continuous development, and has paid heavy profits, which, however, would have been immensely increased had the owners of the mine possessed any facilities for the reduction of the vast amount of ore exposed wherever the explorations were pushed. The mine never looked as well nor showed more extensive ore reserves as it does to-day. A few months ago the owner of the mine and present Supt., Col. J. C. C. Thornton, consolidated the property with that of the Colorado smelting company. The extraction of ore was afterward temporarily suspended and the sinking of the main shaft to the 600 foot station was begun. That depth was reached some weeks ago and a crosscut started south which tapped and intersected the ledge to the hanging wall. A drift is now being run west in a massive ore body and has now attained the length of 40 ft. It will be run to the west end of the claim without delay. In none of the crosscuts in the shaft is the Gagnon vein remarkable for richness, though in no instance has the ore been of too low a grade to pay. The high grade shoot of the Gagnon lies west of the shaft and in all the levels so far developed, an abundance of ore averaging \$70 per ton and running as high as \$500 has been found by the extension of drifts in that direction. In the 300, 400 and 500 levels the main crosscuts have run through an ore body which averaged ten ft in width, but the 600 foot shows a big improvement.

NEW MEXICO.

LAKE VALLEY.—Rio Grande Republican, March 12: Sierra Grande developments are most assuring. A great many eight-hour shifts are at work, keeping prospective work in the lead. Among mining men it is generally considered the part of economy to keep work well in advance, while the ore-bodies and stopes are showing up well. Dan Ferguson at present is giving his undivided attention to Sierra Grande matters, having been relieved of a part of his arduous duties by James Morehead, a young man, who has taken charge of the Sierra Bella. For the past week shipments from this mine have been both large and regular. The gallows frame for the combination shaft is nearly ready, and when finished will be one of the most substantial pieces of workmanship in the territory. The hoisting engine is dismantled, preparatory to being put in place. At present, 50 men are employed on or about the mine. The Sierra Apache continues to contribute her regular quota of rich ore. The work being mostly on the surface, it has been impeded by the weather. The mill foremanship has changed hands since my last, Charles Hellman being superseded by J. Hiscock, a mechanic of no mean ability. Pay day is on us, and a good many miners are leaving for the Cœur d'Alene in Idaho, a rich gold field that is widely advertised in the interest of the Northern Pacific railroad, or something else.

OREGON.

GENERAL NOTES.—Jacksonville Times, March 22: More rain would be advantageous to the miners. Chappel & Co. of Star Gulch are running with half a head of water and doing good work. Mr. Symons, while mining on Jackson creek, not long since picked up a nugget worth \$75. It is said that there is more snow in the mountains than usual, which will prolong the mining season some. This season promises to be a favorable one for many of the miners. All of them will be able to do something. Richard Cook has run his tunnel on Steamboat 320 ft, and expects to soon strike the rich quartz he is looking for. Logg & McDonnell of Forest creek are able to run their pipe several hours each day. They have good mines and only lack water to make a fine showing. Curtis Bros. of Jackson creek have considerable water and are able to run their pipe the greater portion of the day. They are doing well, working over old ground. A rich strike in Bybee & Co.'s mines near Waldo is reported, and it is said that several hundred dollars were taken out there in a short time. We hope the report may prove true. Miller & Kretzer of Farmer's Flat have not as much water as they want, yet they are washing off considerable amount of ground and will no doubt make a good report if the season yet affords a reasonable amount of rain.

For Mining, Shareholders' Directory, Stock Reports, etc., see page 232.

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Ingersoll, D2 3", beat Rand 3 1/2".....	741 "
Ingersoll, D2 3", beat National 3 1/2".....	505 "
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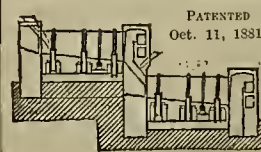
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List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

FOR WEEK ENDING MARCH 18, 1884.

295,147.—CABLE RAILWAY.—J. B. Casebolt, S. F.
295,148.—CABLE RAILWAY.—J. B. Casebolt, S. F.
295,357.—APPARATUS FOR CLEANING SHIP'S SIDES, ETC.—J. L. Cooper, S. F.
295,361.—TWO WHEELED VEHICLE.—Creighton and Taylor, Smith's Flat, Cal.
295,486.—ANIMAL TRAP.—Cushing and Vest, San Jose, Cal.
295,384.—DEVICE FOR REGULATING TEMPERATURE.—J. M. Halsted, Oakland, Cal.
295,255.—COUPLER FOR CAR HEATING APPARATUS.—J. J. Lacey, S. F.
295,185.—FEED REGULATOR FOR THRASHERS.—A. W. Lockhart, Sacramento, Cal.
295,262.—MACHINE FOR CASTING LEADS ON FISH-NET LINES.—E. Manula, Astoria, Or.
295,189.—CULTIVATOR AND HORSE HOE.—C. W. Meador, San Jose, Cal.
295,290.—APPARATUS FOR CURING TEA AND COATING COFFEE.—A. Schilling, S. F.
295,432.—CANISTER.—A. Schilling, S. F.
295,433.—CANISTER.—A. Schilling, S. F.
295,434.—CANISTER.—A. Schilling, S. F.
295,203.—FIRE ESCAPE.—M. Scholl, S. F.
295,305.—GRAIN AND PEA SEPARATOR AND THRASHER.—Alfred Swingle, S. F.
4,001.—LABEL.—Germania Lead Works, S. F.
4,006.—LABEL.—Sullivan and Ravekes, S. F.
NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

WINDMILL.—Chas. W. White, Santa Rosa, Cal. No. 294,943. Dated March 11, 1884. This improvement in windmills consists in vertically-pivoted or swinging concave-convex vanes, the means for holding them open at an angle to receive the wind and the means for adjusting them. Certain weights holding the vanes at an angle with the true circumference afford openings between each for the action of the wind. Its force is directed against the inner face of the vanes, which are drawn on sufficiently to expose more surface beyond the pivot cone than on the nearer side. The tendency of the wind is therefore to force said vanes closed, and thus automatic regulation is effected. Other adjustments are also provided.

NECKTIE FASTENER.—O. M. Graves, Dayton, W. T., assignor of one-half to H. D. Graves, Portland, Or. The difficulty of preventing neckties from rising over a standing collar is well known, and many devices have been used to prevent it, the most common being an ordinary pin. But this is difficult to adjust on account of the stiffness of the collar. This invention is a fastener for neckties which is designed to overcome the obstacle. It consists in a piece of wire bent at the center to form a spring-loop, and having oppositely extending arms terminating in a hook bent inwardly. When the tie is set up in its proper bow, its ends or folds cover and conceal the fastener.

FIRE ESCAPE.—Elam Dye, S. F. No. 294,860. Dated March 11, 1884. This fire escape consists in a peculiar extensible frame, in the means for operating it, and in certain details of construction. The object is to provide a means for the escape of persons from the windows of a burning building, and for such similar purposes. Sections slide within each other, and there is a cage suspended within the frame sections and adapted to be raised and lowered by a rope and suitable gearing.

HOSE PATCH.—Geo. W. Towle, Jr., San Rafael. No. 294,934. Dated March 11, 1884. This is intended for mending a leak in hose. It consists in a circumscribing band provided with ribs on its inner sides, and means for adjusting and securing it. The longitudinal ribs are quite useful, as they serve to guard the weakest point on the band, namely, the edges between the tongues. The cross or circular ribs merely supplement the tongues.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL.

ASSESSMENTS.

COMPANY.	LOCATION, No.	AM'T. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Hydraulic M Co.	California, 5.	25. Jan 25.	Mar 25.	P. M. Scott.	326 Montgomery st.
Belle Isle M Co.	Nevada, 7.	20. Mar 12.	Apr 17.	J. W. Pew.	310 Pine st.
Belmont M Co.	Nevada, 36.	75. Feb 20.	Mar 31.	J. W. Pew.	310 Pine st.
Benton M Co.	Nevada, 12.	20. Feb 5.	Mar 11.	W. H. Watson.	324 Pine st.
Best & Belcher M Co.	Nevada, 23.	50. Feb 5.	Mar 14.	W. Willis.	309 Montgomery st.
California M Co.	Nevada, 11.	20. Mar 14.	Apr 21.	C. P. Gordon.	309 Montgomery st.
Champion M Co.	California, 14.	07. Mar 7.	Apr 10.	Theo. Wetzel.	522 Montgomery st.
Con Virginia M Co.	Nevada, 20.	20. Mar 12.	Apr 16.	A. W. Havens.	309 Montgomery st.
Cheva Santa M Co.	Mexico, 1.	5. Mar 4.	Apr 7.	O. M. McLean.	324 Pine st.
Diana G M Co.	Nevada, 5.	10. Mar 5.	Apr 9.	P. J. Flanagan.	318 Pine st.
Excelsior Water Co.	California, 6.	50. Jan 29.	Apr 15.	H. B. Wheaton.	215 Sansome st.
El Dorado M Co.	Nevada, 2.	08. Mar 6.	Apr 9.	J. H. Sayre.	330 Pine st.
Elko M Co.	Nevada, 3.	15. Mar 4.	Apr 8.	F. Sperling.	309 Montgomery st.
Gold and Curry M Co.	Nevada, 47.	50. Jan 18.	Feb 11.	A. K. Durrow.	309 Montgomery st.
Grand Prize M Co.	Nevada, 15.	25. Feb 23.	Apr 3.	A. M. Hale.	327 Pine st.
Gorilla M Co.	Cal., 3.	15. Feb 27.	Mar 31.	A. Enquist.	436 Montgomery st.
Independence M Co.	Nevada, 13.	20. Mar 12.	Apr 16.	J. W. Pew.	310 Pine st.
Indian Spring Drift M Co.	California, 1.	20. Feb 13.	Mar 22.	A. B. Holmes.	320 Montgomery st.
Jupiter Deep Blue M Co.	Cal., 1.	1.00. Dec 17.	Feb 16.	G. Lande.	426 California st.
Justice M Co.	Nevada, 40.	10. Mar 3.	Apr 7.	R. E. Kelly.	419 California st.
Lake County Quartz M Co.	California, 8.	123. Mar 10.	Apr 16.	A. Baird.	430 California st.
Loreto M & Co.	Mexico, 6.	50. Feb 23.	Mar 25.	H. G. Jones.	327 Pine st.
Marathon M Co.	California, 10.	60. Feb 7.	Mar 7.	G. T. Tilden.	806 Market st.
Marathon Bar M Co.	California, 5.	15. Feb 14.	Mar 18.	J. W. Pew.	310 Pine st.
Mitton M Co.	California, 1.	1.00. Feb 14.	Mar 14.	H. Pichior.	320 Sansome st.
Mayflower Gravel M Co.	Cal., 23.	15. Mar 5.	Apr 6.	J. Morizio.	328 Montgomery st.
North Gold & Curry M Co.	Nevada, 6.	25. Feb 23.	Apr 2.	C. H. Mason.	331 Montgomery st.
Northwest M Co.	California, 17.	40. Jan 18.	Feb 28.	E. J. Holmes.	710 Washington st.
Northern Belle.	Nevada, 8.	8.00. Jan 30.	Mar 10.	A. W. Willis.	309 Montgomery st.
Puget Sound Iron Co.	Washington, 7.	1.00. Mar 12.	Apr 25.	A. Halsey.	328 Montgomery st.
Pedro Coro M Co.	Arizona, 1.	6. Feb 23.	Apr 7.	J. Stadpatt.	419 California st.
Pleasant Valley M Co.	Cal., 3.	10. Mar 3.	Apr 7.	C. E. Elliott.	309 Montgomery st.
Savage M Co.	California, 10.	50. Feb 5.	Mar 12.	E. J. Holmes.	309 Montgomery st.
Union Con M Co.	Nevada, 26.	1.00. Mar 6.	Apr 8.	J. P. Brantington.	309 California st.
Utah S M Co.	Nevada, 48.	1.00. Mar 21.	Apr 28.	M. J. C. Pratt.	209 Montgomery st.
Wildman M Co.	California, 1.	25. Feb 13.	Mar 28.	R. Ellou.	310 Pine st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Champion M Co.	California.	Theo. Wetzel.	422 Montgomery st.	Annual.	Apr 8

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Bonanza King M Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Mar 15
Bodie Con M Co.	California.	G. W. Sessions.	309 Montgomery st.	50.	Apr 5
Bulwer Con M Co.	California.	W. Willis.	309 Montgomery st.	10.	Jan 23
Contention Con M Co.	Arizona.	D. C. Bates.	309 Montgomery st.	25.	Jan 12
Derbec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery st.	10.	Mar 15
Elkaho M Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Dec 2
Jackman M Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar 19
Kentuck M Co.	Nevada.	J. W. Pew.	310 Pine st.	10.	Mar 19
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	325 Montgomery st.	10.	Mar 20
Standard Con M Co.	California.	Wm. Willis.	309 Montgomery st.	25.	Mar 12
Silver King M Co.	California.	J. Nash.	315 California st.	25.	Dec 15
Syndicate M Co.	California.	J. Stadpatt.	419 California st.	10.	Mar 5

San Francisco Metal Market.

WHOLESALE.	
THURSDAY, MAR. 27, 1884.	
VINTIMONY—Per pound.	14 @ 5
IRON—American Pig, soft, ton.	28 @ 00
Scotch Pig, ton.	24 @ 00
American White Pig, ton.	24 @ 00
Oregon Pig, ton.	24 @ 00
Slipper Cap, Nos. 1 to 4.	— @ —
Rehner Bar.	31 @ 33
Horsehoes, keg.	5 @ 50
Nail, Rod.	— @ —
Orway, according to thickness.	— @ —
SEL—English Cast, lb.	14 @ 15
Black Diamond, ordinary sizes.	14 @ —
Drill.	15 @ 16
Machinery.	12 @ 14
Copper—Ingot.	22 @ 22
Braziers' sizes.	33 @ 38
Fire-box sheets.	1 @ —
Nails.	17 @ —
Old.	28 @ —
Bar.	— @ —
Cement, 100 fine.	12 @ —
LEAD—Pig.	42 @ 4
Pipe.	53 @ 6
Sheet.	7 @ —
Hot, discount 10% on 500 bags: Drop, 3 bag.	2 @ 10
Buck, 3 bag.	2 @ 10
Chilled, do.	2 @ 10
TRY PLATES—By the case.	6 @ 60
Coke.	5 @ 57 1/2
Banca Tin.	24 @ 00
Australian.	21 @ 00
L. C. Charcoal Roofing, M20.	6 @ 60
ZINC—By the case.	4 @ 45
Sheet, 7x3 ft. 7 to 10 lb. less the case.	9 @ 10
NAILS—Assorted sizes.	3 @ 25
QUICKSILVER—By the flask.	34 @ 34 1/2
Flasks, new.	1 @ 05
F. Ks. old.	85 @ —

Mining Share Market.

There is little to say of the mining stock market this week. On Thursday morning, the session was dull and transactions few. The shipment from the Bodie mine was by no means up to what was expected after all the talk about the rich ore. Up on the Comstock they are still prospecting away, but have shown up nothing of importance. The miners there ought to be credited with pluck and energy, working away as they do under repeated discouragements. They are still hopeful, however, and, no doubt, if anything is struck deep down, the old camp will boom again.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Bullion Shipments.

Mount Cory, Mar. 18, \$20,729; Hanauer, 18, \$5,850; Horn Silver, 18, \$9,000; Ontario, 18, \$4,672; Hanauer, 20, \$3,850; Crescent, 20, \$5,890; Horn Silver, 20, \$6,000; Ontario, 20, \$4,569; Vienna, 20, \$6,035; Hanauer, 21, \$2,000; Horn Silver, 21, \$6,000; Ontario, 21, \$4,012; Hanauer, 22, \$3,950; Horn Silver, 22, \$6,000; Ontario, 22, \$6,417; Vienna, 22, \$22,330; Horn Silver, 23, \$3,000; Ontario, 23, \$4,031; Horn Silver, 25, \$7,794; Vienna, 25, \$11,250; Crescent, 25, \$2,300; Stormont, 25, \$3,010; Hanauer, 25, \$6,490; Bonanza King, 24, \$8,128.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAR. 6.	WEEK ENDING MAR. 13.	WEEK ENDING MAR. 20.	WEEK ENDING MAR. 27.
Alpha.	1.70	1.75	1.50	1.30
Alta.	1.10	1.45	1.80	1.55
Andes.	40	30	25	30
Argenta.	05	05	05	05
Belcher.	1.10	1.00	085	085
Belding.	2.30	2.20	2.80	2.60
Best & Belcher.	2.30	2.20	2.80	2.60
Bullion.	70	83	60	65
Bonanza King.	35	10.00	30	35
Bodie.	9.50	10.75	9.50	9.25
Bodie Tunnel.	15	20	30	40
Bulwer.	10	17.50	2.10	1.20
California.	20	15	10	05
Challenger.	30	25	25	25
Champion.	15	15	10	10
Chollar.	2.05	2.25	1.65	1.20
Confidence.	1.30	1.50	1.25	1.00
Con. Imperia.	10	05	05	05
Con. Virginia.	25	30	15	10
Con. Pacific.	40	50	45	45
Crown Point.	1.05	2.15	1.00	1.00
Day.	2.25	2.40	2.00	2.00
Eureka.	3.20	3.40	3.25	3.80
Eureka Tunnel.	50	50	40	40
Excelsior.	40	45	30	30
Grand Prize.	05	10	05	05
Gold & Curry.	1.60	1.90	1.25	1.15
Goodshaw.	2.25	2.40	2.00	2.00
Hale & Norcross.	2.20	2.35	2.25	1.70
Holmes.	1.25	1.40	1.60	1.75
Independence.	10	10	15	15
Justice.	15	15	15	15
Martin White.	65	35	75	65
Mono.	1.45	1.60	1.50	1.90
Mexican.	2.10	2.45	1.75	1.95
Mt. Diablo.	2.25	2.50	2.50	2.50
Northern Belle.	2.10	2.35	2.20	2.45
Navajo.	1.05	1.20	1.00	1.35
Occidental.	1.25	1.85	1.75	1.80
Ophir.	1.25	1.85	1.75	1.80
Oversight.	1.05	1.25	1.00	1.30
Potosi.	1.05	1.25	1.00	1.30
Pinal Con.	1.05	1.25	1.00	1.30
Sage.	1.05	1.25	1.00	1.30
Silver Hill.	1.05	1.25	1.00	1.30
Silver King.	1.05	1.25	1.00	1.30
Scorpion.	1.05	1.25	1.00	1.30
Syndicate.	1.05	1.25	1.00	1.30
Tioga.	1.05	1.25	1.00	1.30
Union Con.	1.05	1.25	1.00	1.30
Uta.	1.05	1.25	1.00	1.30
Yellow Jacket.	1.05	1.25	1.00	1.30

Sales at San Francisco Stock Exchange

THURSDAY A. M., Mar. 27.	
320 Bodie.	61 @ 65
50 Alta.	1.30 @ 1.65
300 Andes.	25 @ 30
200 Bulwer.	1.50 @ 2.00
1850 Bodie Con.	71 @ 77
100 Belle Isle.	200 @ 20
100 Con. Pacific.	40 @ 45
250 Crown Point.	1.20 @ 1.40
200 Chollar.	1.25 @ 1.40
100 Excelsior.	30 @ 35
125 Eureka Con.	4.25 @ 4.00
50 Goodshaw.	25 @ 30
100 Gold & Curry.	1.10 @ 1.30
100 Hale & Norcross.	2.20 @ 2.40
100 Holmes.	2.25 @ 2.40
1000 Mono.	1.90 @ 2.10
200 Ophir.	1.55 @ 1.75
100 Syndicate.	2.50 @ 2.75
400 Sierra Nevada.	2.40 @ 2.60
100 Savage.	80 @ 85
50 Tioga.	1.00 @ 1.10
150 Union Con.	1.55 @ 1.65
90 Yellow Jacket.	1.95 @ 2.10
AFTERNOON SESSION.	
875 Alta.	1.40 @ 1.60
850 Andes.	25 @ 30

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto valled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

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BY GUIDO KUSTEL,

MINING ENGINEER AND METALLURGIST.

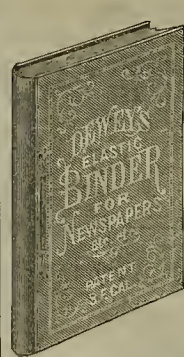
CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arsenures, and Gold and Silver Ores generally, with 120 Lithographic Diagrams. 1807.

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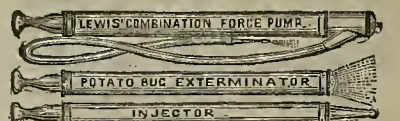


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"ASSAYING GOLD AND SILVER ORES" By C. H. Aaron—Is a new work published by Dewey & Co., which is intended by its author to be available for the use of miners, prospectors and others who only care to know how to assay gold and silver ores. The author of this work is well known in the mining regions of the Pacific coast as a practical metallurgist of many years experience. His writings for the press and his two previous works ("Testing and Working Silver Ores," and "Leaching Gold and Silver Ores") have shown his ability as a writer. The little book is plainly and simply written, more especially for the use of those persons not familiar with chemistry. No symbols are used, everything being plainly stated and clearly described. The scope of the book is shown in its table of contents as follows: Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mining and Charging; Assay Liharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorching; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables. These assaying tables give simple directions for figuring out results. This is the simplest, cheapest and most easily comprehended work on assaying yet published. The volume comprises 106 pages, with illustrations, and is well bound in cloth. The price is \$1, postpaid. Published by Dewey & Co., MINING AND SCIENTIFIC PRESS office, San Francisco—1884.

TO THE LADIES.

MRS. ADCOCK, having just returned from the East, begs to offer to the public some of the FINEST GOODS ever imported to this coast at prices lower than ever before. Inspection is solicited.

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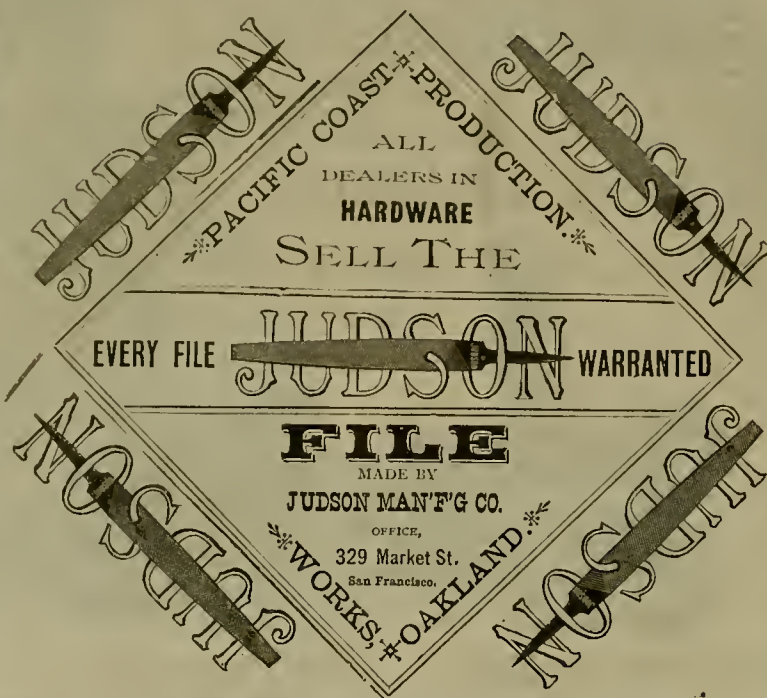
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If any subscriber fails to receive this paper promptly, after making due inquiries at the Postoffice, he is urgently requested to notify this office by letter, that we may send the missing papers, and, if possible, guard against further irregularities.

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Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DELINQUENT NOTICE.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador county, near Drytown, California.

NOTICE.—There are delinquent, upon the following described stock, on account of assessment (No. 44) levied on the 30th day of January, 1884, the several amounts set opposite the names of the respective shareholders as follows:

NAMES.	No. Certificate.	No. Shares.	Amount.
Barlett, J. O.	47	405	\$12 15
Claves, George.	69	75	2 25
Eastman, E. D.	480	200	6 00
Elwell, Mrs. N.	335	50	1 50
Elwell, Octave.	468	50	1 50
Harris, James.	50	50	1 50
Harris, James.	57	50	1 50
Harris, James.	58	50	1 50
Jewett, Thomas A.	441	150	4 50
Jewett, Harriet A.	442	175	6 25
Knox, Joseph A.	440	475	14 25
Knox, Joseph A.	228	100	3 00
Knox, Joseph A.	229	100	3 00
Knox, Joseph A.	230	100	3 00
Knox, Joseph A.	231	100	3 00
Knox, Joseph A.	232	100	3 00
Knox, Joseph A.	233	100	3 00
Knox, Joseph A.	234	100	3 00
Knox, Joseph A.	235	100	3 00
Knox, Joseph A.	236	100	3 00
Knox, Joseph A.	237	100	3 00
Knox, Joseph A.	238	100	3 00
Knox, Joseph A.	239	100	3 00
Knox, Joseph A.	240	100	3 00
Knox, Joseph A.	241	100	3 00
Knox, Joseph A.	242	45	1 35
Knight, J. M.	206	125	3 75
Lagonarzio, C.	49	75	2 25
Lagonarzio, C.	50	50	1 50
Miller, W. J., Trustee.	243	1,750	52 50
Mitchell, Mary J.	263	250	7 50
Mitchell, Susie E.	264	250	7 50
Parsons, C. A.	477	500	6 00
Pratt, Freeman.	496	50	1 50
Rogers, William A.	454	150	4 50
Rogers, Mary T.	455	400	12 00
Stone, W. W.	292	200	6 00
Shiff, Gustave.	136	125	3 75
Shiff, Gustave.	137	100	3 00
Shiff, Gustave.	138	100	3 00
Shiff, Gustave.	139	100	3 00
Shiff, Gustave.	140	100	3 00
Shiff, Gustave.	141	100	3 00
Trefethen, George.	101	500	15 00
White, John S.	100	375	11 25
Wilson, John S., Trustee.	203	250	7 50
Winter, Elisha S.	177	125	3 75

Also 45 shares of old issue, equal to 225 shares of the new issue, of the capital stock of the said Gover Mining and Milling Company:

NAMES.	No. Cert.	No. Old Shs.	No. New Shs.	Amount.
Ames, D. W.	284	25	125	\$3 75
Field, B. F.	169	10	50	1 50
Gorie, Thomas.	682	10	50	1 50

And in accordance with law, and an order of the Board of Directors, made on the thirtieth day of January, 1884, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 8, No. 402 Front street, San Francisco, California, on THURSDAY, the TENTH DAY OF APRIL, 1884, at the hour of one o'clock p. m. of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

MARK T. ASHBY, Secretary.

Office, 402 Front street, Room 8, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, March 1, 1884.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 65, of twenty-five cents (25c.) per share, was declared, payable on WEDNESDAY, March 12, 1884, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.

OFFICE—Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

ASSESSMENT NOTICE.

Gould and Curry Silver Mining Company.

ASSESSMENT No. 47.

Levied March 7, 1884
Delinquent April 11, 1884
Day of sale May 5, 1884
Amount Fifty cents per share

ALFRED K. DURBROW, Secretary.

OFFICE—Room No. 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

JOHN L. BOONE, Attorney and Counsellor-at-Law,

Rooms 7, 8 and 9, 320 California Street, San Francisco. (Over Wells, Fargo & Co.'s Bank.)

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N. B.—Mr. J. L. Boone has been connected with the Patent business for over 15 years, and devotes himself specially to Patent litigation.

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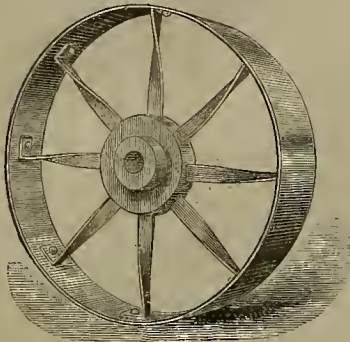
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N. Macbeth, Esq.,—Dear Sir: The Patent Steel Pulleys supplied throughout to our No. 2 Mill are working to our entire satisfaction.

They are very true, and are about 50 per cent lighter than the cast-iron pulleys in our No. 1 mill.

Yours faithfully,

For the Mather Lane Spinning Co. (Limited),
[Signed:] RICHARD T. MARSH,
Managing Director.

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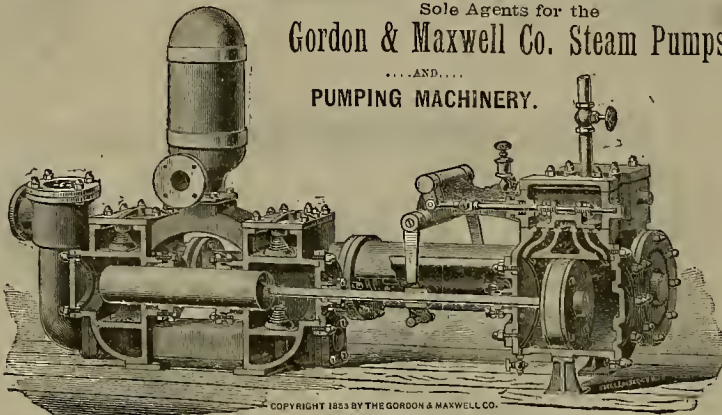
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TESTIMONIALS.

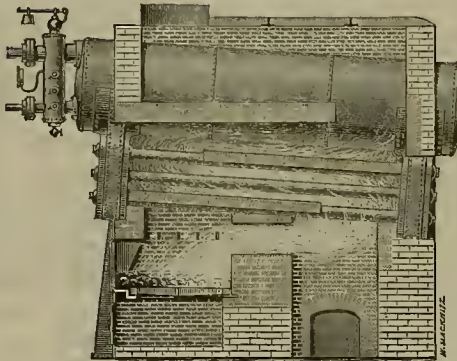
ST. LOUIS, MO., Sept. 28, 1883

Messrs. Adolphus Meier & Co. GENTLEMEN: We cheerfully certify that the "Heine Patent Safety Boiler" put up by you in our establishment has proved very satisfactory in its work. The chief points of excellence in the "Heine Safety Boiler" are its economy in fuel and space, freedom from scaling, aptitude for power and heating purposes, working equally well with clear and muddy water. We warmly recommend it to all using steam machinery. Yours truly,

ANHEUSER-BUSCH BREWING ASSN.

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BERLIN, Sept. 23, 1883.

To Mr. H. Heine, Civil Engineer: In reply to your inquiry of September 2d, we respectfully inform you that the three boilers built under your patents, under steam since September 25, 1881, at the Alexander Platz Depot, as well as the two at Friedrich Strasse Depot, under steam since September 22, 1882, have given good satisfaction, requiring no repairs whatsoever to date. The internal cleaning of the boiler was always accomplished



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(Signed) BRAUCKE.

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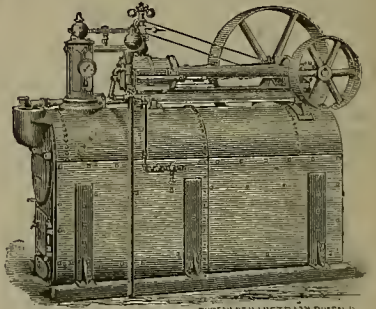
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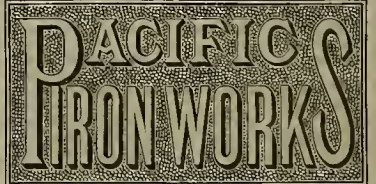
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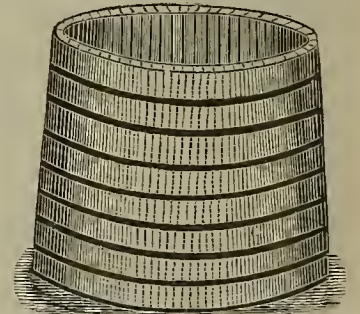


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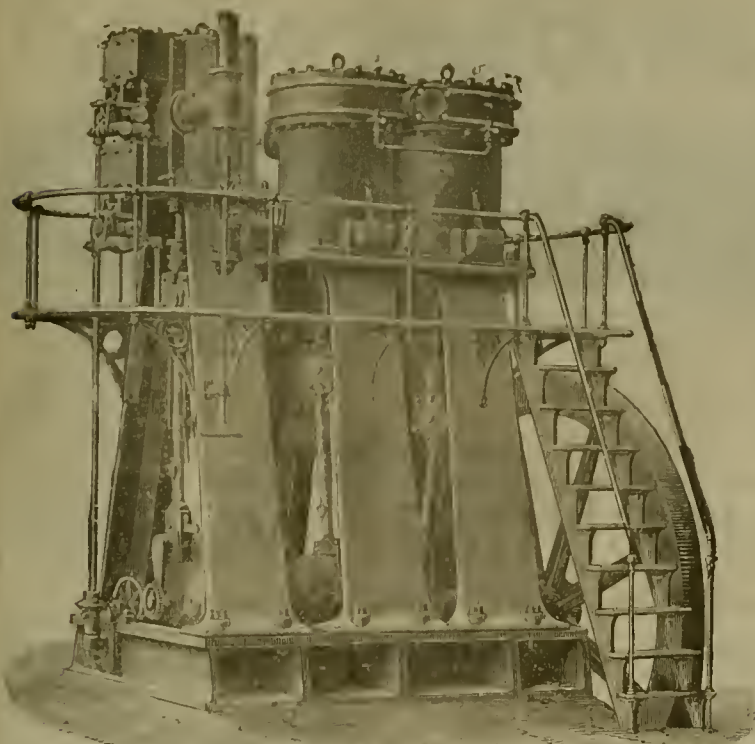
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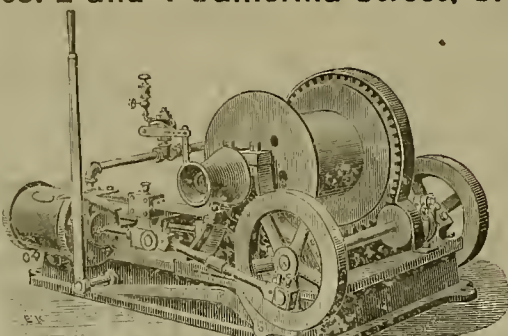
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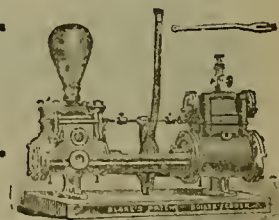
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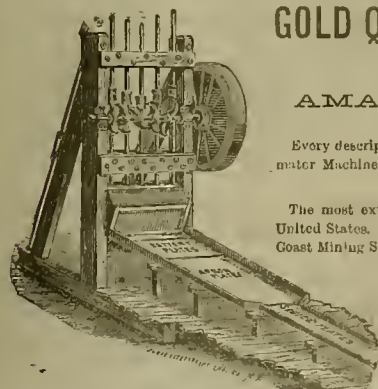
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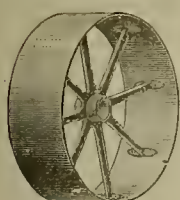
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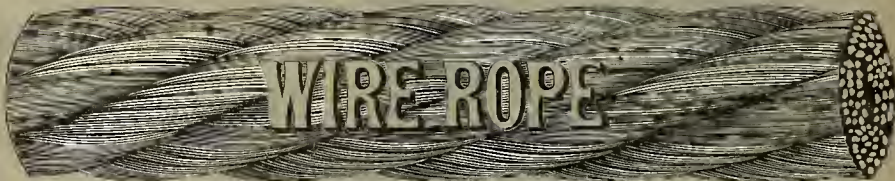
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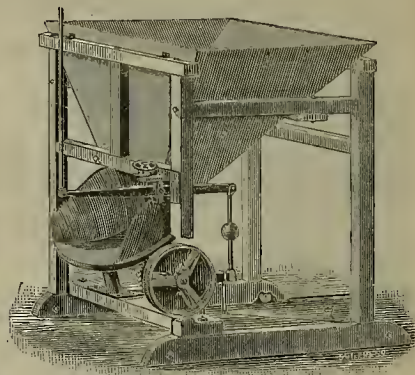
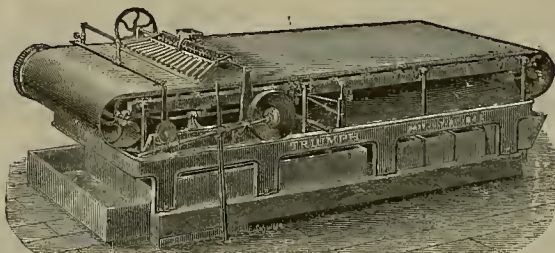
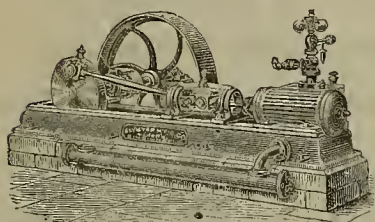
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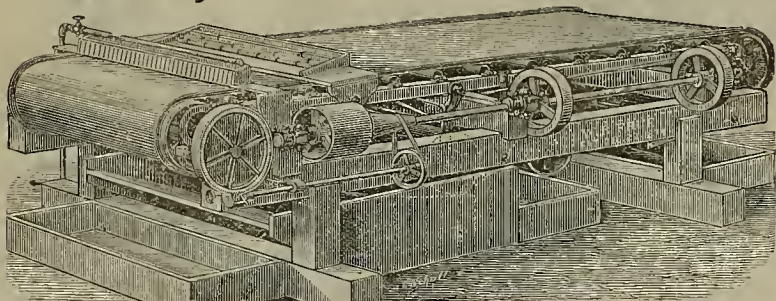
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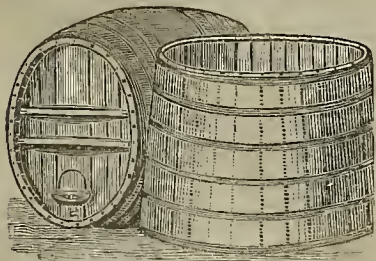
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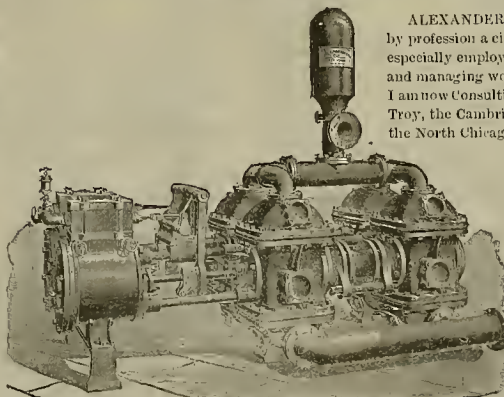
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ALEXANDER L. HOLLEY, being duly sworn, says: I am by profession a civil and mechanical engineer. I have been especially employed during the last ten years constructing and managing works for the manufacture of Bessemer steel. I am now Consulting Engineer to the Bessemer Steel Works of Troy, the Cambria Iron Works, the Bethlehem Iron Works, the North Chicago Rolling Mills, the Joliet Iron and Steel Works, and the Edgar Thomas Steel Works. In all Bessemer Works the hydraulic machinery is the most EXPENSIVE and the HARDEST WORKED part of the plant. Any delay or serious fluctuation in its operation is fatal to the commercial success of the Bessemer process. After extensive acquaintance with the WORTHINGTON ENGINES, and with all such other forms of pumping engines as have been applied to the purposes required, I have adopted it exclusively, and to my knowledge it is adopted in every Bessemer works running or building in America. I have also, for the same reasons, adopted the WORTHINGTON PUMPS for feeding boilers.

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SAN FRANCISCO, SATURDAY, APRIL 5, 1884.

VOLUME XLVIII
Number 14

Dakota Mines.

The Black Hills Mining Regions.

The gold and silver mines of Dakota are situated in the western part of the Territory, between the North and South Forks of the Cheyenne river, and are embraced in a region extending southward from the 45th parallel, about 100 miles in length, and 50 miles in width, as shown in the accompanying map. The Black Hills, in which these mines are found, are mountainous elevations "rising from the plains like islands in the sea," lying partly in Wyoming and partly in Dakota, between the 103d and 105th meridians of north latitude and the 102d and 105th meridians of west longitude. The hills are covered with forests of pine and intersected by rapid rivulets and deep ravines, and occasionally inclose grassy valleys and parks covered with luxuriant vegetation. The outcropping formation below the foothills is slate; above that, in successive order, are beds of limestone, magnesian rock, granite and slate.

In the northern part gold is found in ledges as well as in placers. The veins as a usual thing are of considerable width and filled with low grade ores cheaply mined and easily worked. Some of the ledges are reported to extend 70 miles in length. The trend of the auriferous and argentiferous veins is from north to south. Rapid creek and its tributary, Castle creek, rise in the limestone formation west of the hills, flowing eastward; have cut their way through the mineral veins which contain the original deposits of the precious metals, and have produced rich placer mines in the valleys below, into which the slower currents have dropped the precious metals the waters carried down.

The principal streams that rise in the hills are the Elk, Rapid, Spring, Battle, French, and Beaver creeks, which empty into the south fork of the Cheyenne; and the Bear, Butte, White-wood, Spear Fish and Redwood creeks, principal tributaries of the north fork.

The principal placer mines are located on French, Battle and Spring creeks and their tributaries, but the working of these mines have been retarded by the lack of water.

A ditch to carry water from Cold springs to Nigger hill, a distance of forty miles, is constructed for the purpose of working the ground. The richest placer mines which have been worked are located in the Deadwood, White-wood, Gold Run and Bohtail gulches, which appear to have been worked as far as they can successfully be by the usual methods of sluicing. Great difficulty has been experienced for want of sufficient water. The Bear Butte creek runs through a region rich in silver mines, from which the production thus far has been about \$150,000. The ores, although of high grade, are found in disconnected localities, and no well-defined veins have as yet been developed. Seven or eight miles above Deadwood, bars and banks of auriferous gravel, rich in gold, are found in the bed or on either side of White-wood creek, as it debouches from the hills. Around Central City and Lead City are quartz ledges. From the mines of the Homestake Company, ore has been extracted for hundreds of feet across the formation, and their limit has never been reached.

There are many locations in the hills, equal in extent and as valuable as the Homestake, still undeveloped, only awaiting capital for their development.

The secret of the success of the belt mines of

the Homestake group is in the magnitude of their ore beds and in the inexpensive method of mining and milling their ores, which costs less than \$1 50, and lately only 80 cents per ton. These mines have declared regular dividends on low grade ores averaging only from \$4 to \$5 per ton.

A 100-stamp mill will crush 3 tons to the stamp every 24 hours, and as the ore is easily and cheaply mined, a profit upon the invest-

ment's mills, the last named having been supplied with ore from the Minerva mine.

Hydraulic mining in the Black Hills was carried on in a more systematic manner during the year, and more successfully, than at any previous period. The season was favorable on account of the early and long-continued rains, which furnished abundance of water for hydraulic mining; flumes and ditches were constructed, costing thousands of dollars, and so



THE BLACK HILLS MINING REGION, DAKOTA TERRITORY.

ments in these mines is surer than that in veins of ore assaying into the thousands. Gold is found in nearly every gulch and bill within the mineral belt, and gold mining is carried on from Custer City on the south to Bear Gulch on the north, a distance of 90 miles, and from Rockerville on the east to Rockford on the west.

Homestake, Deadwood-Terra and Father De Smet are the principal large mines. Besides these, many private corporations and persons whose earnings and profits are not reported are taking out large amounts of bullion, and appear to be profitably employed.

The ore from the mines in the Black Tail Gulch has kept 145 stamps running; 60 in the Esmeralda, 20 at Cassel's and 20 at Dorrington's.

far as known the enterprises were judiciously located, and promise the projectors large and speedy returns for their investments of capital and labor.

In the vicinity of Rockerville are mostly placer deposits of auriferous cement, and from the bars and gulches in the neighborhood half a million dollars' worth of gold has already been taken. At Sheridan, on Spring Creek, the fissure vein is reported to be over 100 feet in width, of solid but refractory ore, containing copper, gold, lead and silver.

EAGLE CITY is 2,300 feet above the sea level. The width of Pritchard gulch is 400 to 500 feet, the fall is about two inches to the rod.

Hoisting Ropes.

The use of wire for hoisting ropes in mines is now almost universal. These ropes require great care and attention, however, and their durability depends in a great degree upon the care taken of them, aside from the actual work they have to do. Being in damp and heated places, the surface of the wires must be protected by suitable material such as tar, grease or special compounds. The winding on the reel and the varying strains has an effect in deteriorating also.

The question of actual strength of rope in relation to the working load and velocity is being investigated in Europe by careful persons. It is not probable that the factors of safety adopted by rope makers can be materially altered, still it would be interesting to determine separate factors for dead weight and velocity, and also for various sizes of ropes. As it is there is some margin, the working load being given by English manufacturers at from 1.8 to 1.10 of breaking strain, the difference being, presumably, for varying velocities. In France, the Commission appointed to report on breakages of colliery ropes stated that the best firms only loaded their ropes to one-tenth of breaking strain; but in small ropes of good wire, where each wire had its own share of work, this was occasionally increased to one-sixth. In Belgium the factor of safety is one-seventh; in Germany, one-eighth to one-ninth. The deterioration of ropes by wear is also an important question. The Commission just referred to state that new and old ropes vary in the proportion of 100 to 55 (or 45) and that the difference in strength of individual wires, while not averaging more than 13 per cent in a new rope, approach 75 per cent in a worn rope. The same authorities state that in flat ropes the results are still more marked, as the wires will not, after use, stand one bend in the vice, which is partly attributed to the cutting action of the stitching wires. Now this question, which means the alteration in nature of steel or iron wire, is a very important one, as it must regulate the life of a rope, although apparently uninjured.

PROPORTIONS OF THE STEAM ENGINE.—A little work on "The Relative Proportions of the Steam Engine" has been issued by Wm. D. Marks Whitney, Professor of Dynamical Engineering in the University of Pennsylvania. It is a rational and practical discussion of the dimensions of every detail of the steam engine. The work is illustrated. It is really a series of lectures, and gives in a practical form rules and formula for the determination of the relative proportions of the component parts of the steam engine. This is a revised edition and contains a few added lectures, one of which is "The Cheapest Point of Cut-off." The book comprises over 200 pages, and is really a valuable one for reference. To engine designers and builders it contains much data of the greatest utility. Joseph A. Hofmann, 208 Montgomery street, is the special agent here for the sale of the book.

THE miners down about Silver City are now able to get the ore they have been taking out during the winter reduced without difficulty, as all the mills have an abundance of water.

HEAVILY laden pack trains are arriving almost daily at Eagle.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

The Mount Cory Mine.

[From our traveling correspondent.]

EDITORS PRESS:—This newly developed bonanza mine is in Esmeralda county, Nevada, 12 miles west of Hawthorne, the county seat of Esmeralda county. Two years since some prospecting miners seemed to think they had indications of a good mine, and by persistent labors they succeeded in exposing some ledge and also inducing some visitors to climb along their trail six or seven miles from the valley to see their prospects—each would say an encouraging word, and wind his way back to the depot, hoping to find some mine nearer the open plain.

Among the excursionists over this pleasant route of the C. & C. R. R. were A. G. McKenzie, one of the old Comstock mining experts, and superintendent of the Sierra Nevada, Utah and other mines; a thoroughly practical and experienced miner, a cool, calculating judge of values in mines. With him, Judge G. R. Wells and J. L. Flood, son of J. C. Flood, of bonanza note—who, though a very young man, is considered one of our most careful and cool business men. I saw him first at Hawthorne, and the comments there of business men were certainly of the highest commendation. One remarked that "he has sowed his wild oats, and doesn't put on as many airs as many men do who haven't \$10 to their name." Among the visitors to the Mount Cory prospect hole, were these three gentlemen, who were well pleased with the indications, and bought them for the sum of \$15,000. They then went on and bought hill lands, some 4,000 acres, to secure rights and privileges in connection with, and for the development of, the mine, and for mill site.

For one tract of 160 acres about 4 miles from Hawthorne where they now have their reduction works and machine shops, they paid an old gentleman, who had erected a small brush shanty as sign of possession, \$5,000 for his possessory title and good will. Thus by freely dispensing their cash thousands they secured

Ample Rights and Privileges

For all their contemplated improvements, should the mine, when further developed, prove satisfactory. This development test work was left under the management of superintendent McKenzie, who has spent near two years with a force of excellent miners exploring the ledge thoroughly before making any move toward building reduction works.

This development consists briefly in running various tunnels and drifts, some of which I will enumerate, as they are designated at the mine:

Tunnel A exposes 100 ft. length of ore body.
Tunnel B exposes 130 ft. length of ore body.
Tunnel C exposes 230 ft. length of ore body.
Tunnel D exposes 330 ft. length of ore body.

Tunnel E, the lowest, is now in about 1,200 ft., giving 600 ft. depth of ledge or backs, and has already exposed three well-defined chimneys of ore. The first chimney at 600 ft., second 800 ft. and third at 1050 ft. from mouth of tunnel.

These Chimneys

Occur in a large porphyry dike ranging from 160 ft. to 260 ft. in width. This porphyry dike is in granite formation, and is one of the most perfect and well defined that is to be found in this or any other part of the country, and no doubt from all the surface and underground indications this mineralized dike of porphyry (carrying separate ore bodies) continues for several miles in the direction of S. W. and N. E., which is the direction of the vein.

The Ore Bodies

On those levels described above, in many places show double or parallel veins, ranging from 18 inches to 12 feet in thickness of ore, which, as far as developed, shows a value of about \$60 per ton. The mine has an elevation of 8,000 feet above sea level, and about the same as top of Mount Davidson, thus giving grand opportunity for deep workings, and as if to utilize this idea the superintendent is now sinking a shaft from the bottom of tunnel E at the distance of 1,000 feet from the mouth. This shaft is double compartment, solid work for deep workings. It is sunk about 50 feet south and east of ledge, now down near 100 feet, where they will drift and cut the vein, and the same at each 100 feet of depth. It is now running in some soft porphyry formation as above. They propose when they reach the depth of 100 feet in this shaft to put up good power machinery in the chamber excavated within the tunnel, for this shaft. When this machinery is placed in order the sinking will be pushed rapidly, and rich developments are expected soon. These various prospecting works in the different levels had placed on dumps ready for the reduction 20,000 tons of ore before the mill was built. When they were satisfied that they had a mine, they lost no time until they had secured the lands contiguous and lying along the route of their roadway out to the valley, together with all springs or water rights of Big Squaw creek and all its tributaries for a distance of about 14 miles. By these cash methods this company prepared the way to thoroughly possess themselves of a piece of undeveloped mining property, and all the necessary rights of surrounding lands and water that might be required for the successful working of their mine. In the furtherance of this programme, they have graded a road from the

valley to the mine of about 8 miles, at an outlay of \$18,000, giving them a good, even, down grade from the mine to the mill. While the developing of the mine was going on, the great problem of what

Treatment this Ore will Require

Was being solved with much care. About 20 tons of the Mt. Cory ore were taken to the Geddes and Bertrand leaching mill at Secret Canyon, 8 miles from Eureka, Nevada, which is in charge of Mr. Clark, a very efficient and successful manager of this process. The results of all their experiments and expert counsel made the decision to erect similar works to those of Secret Canyon, but in every possible way to improve on those.

At a cost of \$230,000 they have now completed the mill sufficiently to start up, and make some very satisfactory work, so that it is pronounced now a perfect success, and only requires a short time to adjust the movements of one part to the capacity of other portions, and also with reference to the varying richness of the ore being treated. The Chrome Steel rollers are found to be capable of crushing a larger amount of certain ores than can be successfully treated by some of the other machines, but this and various differences will be readily discovered and adjusted by Mr. Albert Arents, who is in charge of the whole process and is considered a thorough proficient in all departments of the metallurgy of the precious metals.

They are moving off carefully, not running up to the full capacity. Last week sent down \$21,000. result of 10 days' run. Now working about 40 men in and about the mill, which is now working only about 50 tons daily, but when they get all adjusted they expect to easily handle 60 to 70 tons daily.

The ore will assay about \$60 on average. Now employing about 60 men in the mine.

While building the mill they had a pay-roll of 165 men at one call.

This now completed mill, built by Sankell and Eckert, is considered a grand testimony of their skill and ability to plan a grand success. This little Trio Bonanza firm, incorporated as "The Nevada Mining and Commercial Co.," have very modestly expended about \$500,000 in cash, preparatory to taking out dividends, from one of Hawthorne's mines. In my last letter I spoke of several of the districts that completely surround Hawthorne, and each have good openings for bonanza enterprising men to invest.

It was my intention to give a short description of this mill, but my letter is already too long, and as we have the promise of one of this bonanza firm that we shall have a

Full Detailed Account of Mill, Process

And treatment throughout as soon as it is fully regulated, I will defer that for the present, and wish this company the best success, and advise Hawthorne not to get alarmed even if she gets surrounded by these monopolizing, cash-paying capitalists, who open roads, open mines and ship big hullion. Let your narrow-gauge railroad monopoly run right along—it may help to bring gouty capitalists, who otherwise would never know anything about your thousands of rich mines now held by the original "we, the undersigned locators." We will watch your local papers carefully, to note Mt. Cory's successes and your general development progress.

This Mount Cory property is entirely a private enterprise of the three incorporators, and not on any stock board, nor is there any stock for sale. They therefore are not seeking in any way to put their business matters before the public, but so much is obtained by request.

B. W. CROWELL.

[Since the above letter was written, Mr. McKenzie, the superintendent, has passed away, dying very suddenly, and Mr. Arents has been chosen superintendent.—EDS. PRESS.]

WYOMING'S WEALTH.—A correspondent of the *Tribune* from Rattle Snake Mining district, Carbon Co., Wyoming, March 10th, says: "Perhaps you would like to know something about this country. The place is eighty miles north of Rawlins and the road from here to Sand creek is about forty miles, twenty of which is like Little Cottonwood in winter, but there are no snow-slides. We are accustomed to snow and so we don't mind it. The next place we strike is Sweetwater, where the soda lakes are. Here is where Brigham Young used to get the stuff he used in making bread. The soda is one inch thick on top, and underneath it is from one foot to twenty feet deep, all solid soda. The next place we strike thirty miles away is the Oil Camp. In looking around I met an old-time miner from California, and well known in Salt Lake City and the mines around. It was Cap. S. I. Iba. He has the best oil springs and the best oil ever found. He feels happy. Before six months roll around there won't be a foot of land left in this basin for a man to take up. It is about seventy-five miles long and ten miles wide. A Cheyenne, a Rawlins, a New York and two Denver companies have property here. There will be two railroads in here before long. The wealth and the attractions are so great that railroads are bound to come. There is a great deal of farming land on the Platte river and the creeks running into the Platte. There is also a big cattle trade here. The C. P. goes through the heart of the stock country, the silver and gold mining region, the vast soda beds and the everlasting oil wells. There are but few miners here. I think this will beat digging in the snow for gold."

Globe District.

The Experience of a Mining Camp.

We have watched with interest, says the *Globe* (Arizona) *Chronicle*, the present condition of the Globe mineral district; have weighed its present condition and future prospects, and after a careful and impartial investigation have come to the conclusion that there is nothing to discourage our people on account of the present stagnation of business. From some cause, which our wisest statesmen and most learned economists have been unable to satisfactorily explain, there has been for the last year a general stagnation of business throughout the whole country—east, west, north and south the general cry has come that business is languishing, and the daily reports of failures throughout the United States have never been more discouraging. Whilst money has been plenty and cheap in the monied centers of our country, yet the general complaint has been made as to the dullness of trade and want of activity in business circles. Why this is no intelligent cause has been assigned, as the resources of our country have never been more abundant, and, with the single exception of the iron interests, all appear to be flourishing and in a prosperous condition. Our farmers were never more prosperous in the agricultural States, and our grazing and feeding industries were never more flourishing, as the price of beef, pork and all kinds of grain fully testify.

Why business is dull in Arizona may perhaps be explained by the fact that Eastern capitalists have become somewhat cautious in regard to mining investments, and for the present are withholding their means to develop our resources. The country has been overrun by a class of adventurers who have induced capitalists to invest their funds in enterprises that simply meant "bread and butter" for a few superintendents and their particular friends, while the honest workman and the credulous capitalist have been the victims of these sharpers; and by this means the country has been brought into disrepute, and all must suffer.

Take the Globe district as a sample of the mining industries in this Territory. Almost millions of money has been invested in the district. Expensive mills and mining operations commenced, and all of a sudden operations have ceased, and the mills and mines are standing idle, living monuments of either mismanagement or wild speculation on the part of adventurers, and not for the want of paying mineral in ample quantities.

The wild spirit of speculation has been the great drawback of this territory. Men come here expecting, in a few short months, to "strike it rich," and then return to their native homes and enjoy, at their leisure, the wealth they expected to realize in a few months. The hills were covered with prospectors, and unless rich leads were found that paid hundreds to the ton from "the grass roots" down, they were hastily abandoned and new ventures made; and the result is that thousands of prospects were made—now abandoned—which, if they were worked on business principles, would pay good daily wages to the miner, and lead to a legitimate industry that would cause this town to flourish far beyond any other town in a purely agricultural region. The wealth is here—almost unbounded—and the time will come, if not in the immediate future, at no distant day, when the honest toiler can realize more for his labor than in any other locality, for he honestly believes that the Globe Mineral district is the richest body of mineral lands on the continent. Whilst, as yet no great bonanza has been developed, yet no other district shows such a general diversity of mineral wealth, for we have gold, silver and copper in almost every range and valley in the district, and from this source alone the great vitality of Globe, in defiance of a general stagnation of business, holds fast to her position and promises to weather the storm and come out victorious in the end. Let her people stand fast, exert all their powers in a legitimate and honest industry, and all will be well.

The greatest obstacle we have had to encounter has been the wild and crazy speculation of adventurers. Promising mines have been discovered—prospects merely have been sold for thousands of dollars to Eastern capitalists on false representations. Money has been invested in building mills and purchasing costly machinery before even a ton of paying ore was placed on the dumps. Companies were bankrupt before they commenced operating their mills, and superintendents and supernumeraries swallowed up the spare funds in extravagances and wild schemes, and before even a proper test could be made the stockholders were exhausted and the mills now stand idle. We can point to more than one instance in our immediate vicinity of this character.

The town of Globe is now going through the ordeal of a past record of reckless speculation and an honest and legitimate business. The wild fancies of the theorist and speculator must give way to the legitimate and frugal industries. The mineral is here, and in ample quantity to build up a thriving and prosperous community, and ere long men of brains and capacity will take hold, and the sound of the hammer and the puff of the engine will be heard in our midst; and the men of nerve and backbone who stand the test and hold on will be rewarded for their bravery. Let every man in Globe and vicinity be determined to "hold the fort" and we feel satisfied all will be well.

The Sierra Buttes Mine.

As this is the best paying mine, not only in Sierra county, but also one of the best in California, it is entitled to more than passing notice from time to time. The past history of this great mine, from 1851 down to the present time, since which date there has been no cessation in the taking out and crushing of ore, is a matter well known to all our readers and to the whole mining world. The object of this article is to give a description of the mine as it stands at present, to note minutely the work that has been going on there for the last couple of years. There are eight tunnels run through solid rock, from which the ledges have been worked. Tunnel No. 1 runs entirely through the hill; tunnels No. 1 to 5 are from 700 to 2,500 feet in length; No. 6, 4,500 feet; No. 8, over 3,000 feet. The ledge is now being worked 1,000 feet below the upper tunnel. No. 9 tunnel is on a level with Sierra City, and was started three years ago. The diamond drill is used in boring, being impelled by compressed air forced through pipes into the tunnel. This tunnel is now in 3,700 feet. Eventually it will be run 9,000 feet. At 6,000 feet it is expected to strike the pay ledge, 700 feet below the present workings. Last July's work was begun on a forty-stamp mill at No. 9 tunnel, and this week twenty stamps commenced crushing on ore from No. 8 tunnel. The ore is transported from that point to the mill on a double-track tramway 1,400 feet in length. The other twenty stamps will not be ready for operation before June. George Woodward, an experienced mill builder, has had charge of this work. Under his skillful and practical eye a piece of work has been done that is not only a credit to himself, but also a matter of pride with Sierra county. Ours is a mining county, and it is something to boast of that we have one of the finest quartz mills in the State. Sierra City in particular has reason to put on a little extra airs. The dimensions of the new mill are 98x85 feet, and 81 feet high. The machinery is propelled by a six-foot Pelton wheel, with 550 foot pressure of water. The mill is supplied with eight Frue concentrators, Hendy's self-feeders and a Blake rock-breaker. Outside of this nearly the entire machinery has been furnished by Forbes & Taylor, of the Downieville Foundry. Wherever it was practicable to use steel around the batteries it has taken the place of softer metal. The tappets, bosses and cans are made of steel. In two or three years the entire works of the mine will be moved down to the lower levels, and Sierra City will be much benefited thereby. The Sierra Buttes mine alone will insure prosperity to our town for many years to come.—*Sierra Tribune*.

Horse-Power Mining Hoist.

The following lines regarding the operation of the "Baker Mining Horse-Power Hoist," will be of interest to parties engaging in opening new mines. It is a machine that is destined to play a very important part in the early stages of mine development in all parts of the country.

STODDARD, Yavapai Co., A. T.

October 10, 1883.

Messrs. Rankin, Brayton & Co.—GENTLEMEN:—The "Baker Mining Hoist" which we purchased of you some months ago, does all you claim for it in a most satisfactory manner. In sinking shaft we are hoisting from 25 to 30 tons of rock per day of 24 hours, from a depth of about 200 feet, and when we commence drifting, shall double the amount. The machine is strongly geared and works more easily and rapidly than any we have ever seen. It has also the advantage of great permanence and durability as well as having safety appliances that afford perfect security from accident. Our foreman who has had sixteen years of mining experience, says it is without exception, the best Horse-Power Hoist in use.

Wishing you the success the machine merits, I am respectfully yours,

BENTON H. WILSON,

Superintendent.

THE printing world of London is much disturbed by the discovery of a new process which enables any number of copies to be taken of any book, even the oldest, without setting a line of type. A compound has been discovered which may be spread upon a page without in the slightest way injuring the paper, and which refuses to rest upon ink. It can be easily removed to a stone, and there becomes the matrix for stereotype, or can be used for printing from at once. Practical printers are experimenting to see whether they cannot save the cost of re-setting old editions, and, if certain practical difficulties are removed, there will be a change not only in the production of *fac-similes* of old books, but in the reproduction of new ones. It will be no longer necessary to keep type standing, as a proof will be as good as a stereotype plate.—*Exchange*.

THE BONANZA MINES.—In answer to a question by a correspondent, the *Virginia Chronicle* gives the following information: The average of the Bonanza mines during the period of their greatest prosperity was \$3,000,000 per month in bullion. Of this amount 40 per cent or \$1,200,000 was gold. Assuming that an avoirdupois pound of gold is worth \$300, the weight of that amount would be 4,000 pounds or two tons. The greatest amount extracted in any month was \$4,000,000 in bullion, the gold of which would weigh nearly two tons and a half.

MECHANICAL PROGRESS.

A Bisulphide of Carbon Motor.

We have already made allusion to an invention in Chicago of a new device for employing the vapor of carbon bisulphide as a substitute for the vapor of water for motor purposes. The new engine is called "A Triple Thermic Motor," and a late number of the *Chicago Tribune* gives a detailed description of it, and expresses the opinion that it is destined to work a revolution in motive power.

According to the *Tribune*, the engine consists of four principal parts: A generator, boiler, engine and condenser.

The generator is a common 10-horse power locomotive portable boiler, filled with water in the usual manner.

The boiler is a plain tubular boiler, surrounded by an iron shell or casing, (instead of being walled up in the usual manner) dispensing with grate bars, fire front castings, breeching, and large smoke stack, having at each end a heat receiving and distributing chamber. These chambers are formed by the walls of the casing projecting six inches beyond the heads of the boiler, and are connected with the generator by means of a pipe, and with each other by the tubes of the boiler (running from one end to the other). The boiler is filled with carbon bisulphide to the usual water line.

The engine is of ordinary construction, having its cylinder and steam chest jacketed and so arranged that the aqueous vapor in the jacket and the bisulphide of carbon steam in the cylinder do not come in contact with each other.

The cylinder of the engine and the boiler are connected by a steam pipe, which is inclosed in a pipe which connects the casing of the boiler and the jacket of the cylinder.

The condenser is the same as that of an ordinary steam engine, with the exception that it does not have one-fourth of the condensing surface.

Heat being applied to the generator and steam generated from the water passed over to the heat receiving and distributing chambers, the carbon bisulphide in the boiler will become heated to a temperature corresponding with that of the generator by the steam passing under the boiler and returning through the tubes to the chambers.

If the water in the generator is heated to 230 degrees, the gauge will show six pounds to the square inch of a working pressure. The gauge on the heat receiving chamber will show a corresponding pressure, while the gauge on the boiler will show sixty-eight pounds of a working pressure.

Now, suppose this is the number of pounds desired by the engineer, just as soon as it is obtained an automatic valve attached to the pipe connecting the heat receiving chamber and generator will be operated by the pressure itself, and no more heat can pass to the boiler until the pressure falls below sixty-eight pounds; falling below this the heat will again pass in. This valve, acting automatically, perfectly regulates the heat, and therefore controls the vapor's expansive force, that bursting the boiler is a physical impossibility. The engineer opens a valve and permits the aqueous vapor to pass into the jacket that surrounds the cylinder and the steam chest, heating them to the temperature of the boiler. The throttle-valve is now open, and the vapor of carbon bisulphide turned into the cylinder at a temperature as high as when it left the boiler. After performing its office there it is exhausted into the exhaust chamber of the condenser, and by contact with the metallic surface is condensed and collected in the well at the bottom, and by the use of a pump returned to the boiler to be again evaporated, and so on indefinitely. The exhausted carbon bisulphide vapor by a simple contrivance is used to heat liquid carbon bisulphide between the pump and the boiler to a degree much above its boiling point, which is of great advantage, as it assists condensation in the condenser and evaporation in the boiler.

How the Carbon Vapor is Produced.

The mode of heating by aqueous vapor is as follows: As soon as the steam in any of the pipes, tubes or chambers is condensed it will then have surrendered all of its sensible heat in excess of 212°, and it will also have surrendered 966° of latent heat, or a total of say 1,000 thermal units to the carbon bisulphide. This 1,000 is now sensible heat, and will accomplish the same purpose as though received directly from the furnace. Having changed its state from a vapor to a liquid, it is permitted to leave the chambers through a steam trap, and by the use of the pump returned to the generator at a temperature very little below its boiling point. In the generator it will receive 1,000 thermal units, carry it over to the chambers, surrender it all up, and return for another load.

The water in the generator need not be supplied more than once a month; the carbon bisulphide but once during the lifetime of the machinery.

Oil of no kind can be used to lubricate any part of the machinery that is exposed to the action of the vapor of carbon bisulphide. After repeated tests with graphite (or plum bago), it was adopted, being comparatively inexpensive, and as a lubricant giving the highest satisfaction. It is conveyed to the parts

requiring it by the aid of a cup specially adapted for the purpose.

The reader will doubtless ask why are the boiler, pipes and cylinder incased and surrounded with aqueous vapor? It is on account of the small amount of latent heat and the low specific heat of carbon bisulphide. If not thus protected by aqueous vapor it would lose 50 per cent of its expansive force before reaching the cylinder. Aqueous vapor is selected, as of all substances it is of the very best to prevent the escape of heat by radiation or conduction.

One Cause of Previous Failures.

Many attempts have been made to heat carbon bisulphide by bringing it in direct contact with the water, but the impurities of the water and the action of water on metallic surfaces produce compounds that destroy the carbon bisulphide, and the vapor or steam passing to the condenser renders condensation more difficult. The carbon bisulphide liquid and vapor must be separate from all other liquids or vapors.

How is it possible to effect so great a saving in fuel when aqueous vapor is used for heating and carbon bisulphide for propelling the engines? We can only answer that it is done by employing that agent to do the kind of work it is by its nature best adapted to perform—steam, pound for pound, can carry more heat than any other substance; it is, therefore, employed to carry heat. It will not only carry but will honestly deliver up all it carries at the right time and place. Carbon bisulphide has greater expansive force for the same number of thermal units than any other staple compound; it is, therefore, employed to propel machinery. The better to understand

How This Great Saving is Effected

By the use of the process and machinery just described, a knowledge of the cost of the production of steam and the use that is made of it is necessary. For example, to obtain a working pressure of sixty pounds, even when the water is pumped into the boiler at its boiling point, requires an expenditure of 1,000 thermal units. Now, the engineer can by no possibility in any steam engine use more than 100 of these, and throws the 900 away by the exhaust. That is, the steam when it is exhausted has only parted with its actual heat in excess of 212°, and carries off as waste all its latent heat. This is true of every steam engine now in use. Whereas, if steam is used to heat the carbon bisulphide not one unit of heat is thrown away.

On the other hand, of the 216 units that it requires to produce a like pressure with carbon bisulphide, the exhaust only carries off 156 thermal units. Therefore there is a saving of 966 less 157, or 810 thermal units on every pound of water evaporated. That is a saving of 81 per cent in favor of carbon bisulphide. This is

What is Claimed for "The Triple Thermic Motor"

In comparison with the steam engine:

1. It requires no greater skill to operate.
2. It insures a more uniform power.
3. It is adapted for all purposes for which the steam engine is now used, and for many purposes for which it is entirely inapplicable, especially for mines.
4. Less liable to explosion.
5. There is no corrosion in the boiler.
6. The boiler can not be burned.
7. No new machinery required, or extra skill by those prepared to build common engines.
8. No noise, no dust, no grease, no sparks.
9. It will do the same work with less than one-fourth of the fuel.

A NEW STEEL is being produced by a company in Sheffield, Eng., which, if reports are true, will be of great value to the railway as well as the manufacturing world. The product is made by adding from 7 to 20 per cent of "the ordinary ferro-manganese of commerce to iron either wholly or to a good extent decarbonized and refined, and treated by any of the ordinary processes, or to steel produced by such processes." A small test bar containing 12 per cent of manganese was bent double when cold, and was sufficiently hard to turn iron. An axe, containing the same percentage and which had neither been hardened nor tempered, being just as it came from the mould, cut in two a bar of iron half an inch square. The correspondent of the *American Manufacturer*, who gives these facts, says that the steel is capable of being hammered or rolled the same as ordinary wrought steel, and that the specimens showed no magnetic qualities. He adds: "An impetus to the steel-rail trade has certainly been given by this invention; for chilled rolls should now be pushed from their stool."

TO PREVENT BOILER EXPLOSIONS.—An ingenious device to prevent boiler explosions has recently been patented. It consists of an electric battery placed on the wall near the boiler, connected with a gong by negative and positive wires. These wires run to the water gauge and connect with a glass bulb filled with mercury. When the water falls below the point of attachment, the steam rushes into the space surrounding the mercury bulb, and the mercury expands. As it rises in the tube it comes in contact with a platinum wire, thus closing the electric circuit and ringing the alarm bell. When water is pumped into the boiler it forces the steam back, breaks the circuit, and puts the alarm in working order again. This invention recommends itself on account of its simplicity.

SCIENTIFIC PROGRESS.

The Heat-Sense of Science.

The sense of sight is not the only sense affected as an iceberg is approached. There is a sensible lowering of temperature. But to the natural heat-sense this cooling is not so obvious or so readily and quickly appreciated that it could be trusted instead of the outlook of the watch. The heat-sense of science, however, is so much keener that it could indicate the presence of an iceberg at a distance far beyond that over which the keenest eye could detect an iceberg at night; perhaps even an isolated iceberg could be detected far beyond the range of ordinary eyesight in the daytime. Not only so, but an instrument like the thermopile, or the more delicate heat measures of Edison and Langley, can readily be made to give automatic notice of its sensations (so to speak).

As those who have heard Professor Tyndall's lectures any time during the last twenty years know, the index of a scientific heat measurer moves freely in response either to gain or loss of heat, or, as we should ordinarily say, in response either to heat or cold. An index which thus moves can be made, as by closing or breaking electrical contact, or in other ways to give very effective indication of the neighborhood of danger. It would be easy to devise half a dozen ways in which a heat indicator (which is of necessity a cold indicator), suitably placed in the bows of a ship, could note, as it were, the presence of an iceberg fully a quarter of a mile away, and speaking of it much more loudly and effectively than the watch can proclaim the sight of an iceberg when much nearer at hand. The movement of an index could set a fog-horn lustily announcing the approach of danger; could illuminate the ship, if need be, by setting at work the forces necessary for instantaneous electric lighting; could signal the engineers to stop and reverse the engines, or even stop and reverse the engines automatically. Whether so much would be necessary—whether those among lost Atlantic steamships which have been destroyed, as many have been, by striking upon icebergs, could only have been saved by such rapid automatic measures as these—may or may not be the case, but that the use of the infinitely keen perception which the sense-organs of science possess for heat and cold would be a feasible way of obtaining much earlier and much more effective notice of danger from icebergs than the best watch can give, no one who knows the powers of science in this direction can doubt.—Prof. R. A. Proctor, in *Popular Scientific Monthly*.

Limit of Hearing.

This subject has recently been studied by M. E. Panchon, and his results have been communicated to the French Academy of Sciences. The notes were produced by a powerful siren of the kind invented by Cagniard-Latour, and actuated by steam. The highest audible notes produced in this way had 72,000 vibrations per minute. Mr. Panchon has also vibrated metal stems fixed at one end, and rubbed with cloth powdered with colophane. In diminishing the length of the stem the sharpness of the note is increased. Curiously enough, he finds that the length of stem giving the limiting sound is independent of its diameter; and for steel, copper and silver the lengths are in ratio to the respective velocities of sound in these metals—that is to say, 1,000 for copper, 1,002 for steel, and 0.995 for silver. Colophane appears to be the best rubbing substance. When the acute sound ceases to be heard the sensitive flame of a gas jet is still affected by it.

While upon this subject we may mention that Mr. Francis Galton has recently invented a "hydrogen whistle," which enables him to obtain notes far above the upper limit of human hearing, its object being to test the hearing powers of insects, which, as is now known, have very acute ears. The number of vibrations produced by a gas in a whistle is universally proportional to the density of the gas, and as a hydrogen is thirteen times lighter than air, the sounds produced by it in a given whistle are thirteen times shriller—that is to say, the pitch is thirteen times higher. Mr. Galton has made a whistle 0.14 inch long and 0.04 inch in diameter, which, with hydrogen gas, gives a sound of 312,000 vibrations per second. The whistle is fitted with a piston at its base to regulate its length, and it is probable that still higher notes can be obtained with a shorter length.

Earthquake Phenomena.

In the last issue of the *Popular Science Monthly*, M. Danhee has an instructive paper, with the above title, from which we reproduce the following explanations respecting the probable causes of these occurrences:

The causes of earthquakes have long been the subject of many conjectures. The numerous investigations of later years have contributed much to define their characters, and several data recently acquired tend further to make their mechanism clear. It is known that the shocks are by no means distributed haphazard over the surface of the globe. The countries

where the strata have preserved their original horizontal position, like the north of France, a part of Belgium, and the most of Russia, are privileged with tranquility. Violent commotions are manifested particularly in regions that have suffered considerable mechanical accidents and have acquired their last relief at a recent epoch, like the region of the Alps, Italy and Sicily. The tracts that are simultaneously disturbed by the same shock most frequently comprise areas from 5 to 15°, or from 300 to 1,500 kilometers. They rarely include a much more considerable fraction of the globe, although the celebrated catastrophe at Lisbon on the first of November, 1755, extended over some 17° or 18°, into Africa and the two Americas, or over a surface equal to about four times that of Europe.

The detailed examination of many earthquakes has enabled us to determine the center of the shocks as well as the contours of the disturbed areas. From the manner in which the latter surfaces agree with the lines of pre-existing dislocations, several of the most distinguished geologists, including Mr. Dana, M. Suess and Albert Heim, have considered the shocks in question as connected with the formation of chains of mountains, of which they may be a kind of continuation.

In fact, the crust of the earth everywhere shows the enormous effects exercised by the lateral pressures that have been in operation at all epochs. The strata, bent and bent over again many times through thousands of meters of thickness, as well as the great fractures that traverse them, are the eloquent witnesses of these mechanical actions. Notwithstanding the apparent tranquility now reigning on the surface of the globe, equilibrium does not exist in the earth, and commotions have not been arrested in its depths. The proof of this is found, not only in earthquakes, but also in the slow movements of the soil, of elevation and depression—a kind of warping, which has continued to manifest itself within historical times in all parts of the globe.

The Growth of Specialism.

One of the most obvious results of the rapid expansion of the boundaries of science, as it affects the man of science, is the multiplication of specialists. This result it would perhaps be as logical to designate as one of the evidences of the rapid progress that science is making.

A century ago, or even less, says the *Manufacturer and Builder*, it was not impossible for a single mind exceptionally gifted—like that of Humboldt—to hold within its comprehensive grasp a large portion of the classified knowledge included under the name of natural science. Had he lived in our day, he would never have ventured upon the task of writing a "Cosmos." To-day the man of science, to make his name known and his influence felt, must be a specialist. He must choose between superficiality and thoroughness. If he choose the first, he may pass for a man of learning among the unlearned, but he will be a feather-weight when weighed in the balance of real achievement; if he choose the latter, he must limit his work to a circumscribed area. It will be well for the ambitious student to recognize the fact, early in his career, that he can only hope to master the general principles of the body of the sciences, and that to be of use he must select what may appear to him to be a very subordinate branch of some favorite science, and devote himself to this with zeal, and without fear that he will shortly exhaust it. It may wound his vanity to think that he must content himself to being simply an "ologist" of some kind; but, alas! so vast has been the accumulation of knowledge, and so wide do the boundaries of science extend, that no one mind may compass the whole.

In our day it is "the man of one book" that is to be feared. The specialist wields the baton of leadership.

EVIDENCE OF THE GLACIAL PERIOD IN COAL BEDS.—We find an interesting description of a recently discovered phenomenon, showing the glacial action on a seam of coal, in a letter from Jones, Simpson & Co., published in a late issue of the *Coal Trade Journal*. "The discovery was made by the men at work opening a chamber from the airway, when they encountered a mass of round stones weighing from 1 to 6 or more pounds each, rising like a wall in front of them and extending across the face of the workings, from within about 1 foot from the bottom of the vein and up to the roof; worked around it and found the coal all regular, with this pillar standing in an almost oval shape (the greatest length about 20 feet); started to clean it out and found it ran through the rock to the surface, a distance of over 40 feet. Now it is cleaned out the coal and rock are perfectly smooth, and cut in and out in an almost spiral form, and presenting, as far as we can ascertain, one of the first glacial pot holes discovered in the anthracite coal fields of Pennsylvania. The material taken out was round, smooth stones of different sizes, mixed with gravel and fine sand."

ECONOMICAL TESTS.—The relative efficiency of electricity, gas and oil, for use in lighthouses, is being tested in England, where the Trinity Board has selected certain ranges about three miles inland from the South Foreland lighthouse as lines of observation, along which measurements are to be made. These experiments are expected to last several months.

New Reverberatory Ore Furnace.

A reverberatory ore furnace has just been patented through the MINING AND SCIENTIFIC PRESS Patent Agency by George W. Jones, of Silver Creek, Alpine county, in this State, and assigned to Adams & Carter, of this city, the agents of the well known Frac concentrator. It is a desulphurizing and chloridizing furnace. The special improvements consist in such an arrangement of hearths that the ore may be roasted in a chamber from which the fumes of the chlorine are excluded, but which is so connected with the chamber or chambers wherein the chlorination is effected that charges of ore may be withdrawn from it into said chambers. The arrangement consists of a number of furnaces provided with a track upon the top to facilitate the charging of the whole with ore. There are various doors to the hearths to admit of independent manipulation of the ore. In a three hearth furnace, the hearths are built one over the other in the same shell.

The furnace shells are of brick work. A lower hearth, a central hearth and top hearth is made. These are made by brick diaphragms, and that separating the bottom and central one is very wide. A fire-box or chamber is made for the lower two hearths, and a separate fire-box for the upper one. The escape flue for the center hearth extends upward past the upper hearth, but is entirely separate therefrom, being enclosed, whereby none of the escaping products will find their way into the upper hearth. The escape flue for the upper hearth is at its further end. These escape flues extend upwardly and are enclosed in the arch, from which a common stack opens out. Through the top of the furnaces are made apertures in which are hoppers for feeding the ore. The advantage of this construction may be explained as follows: Ores designed for treatment in this furnace are those containing sulphur. It is necessary to roast the ore to drive off the sulphur, that the chlorine may have better effect; but the inventor has found that such a high degree of heat is required for the process of desulphurizing that when the chlorine is put in it has a tendency to volatilize the precious metals, and thus a great loss is suffered. Mr. Jones states that in his furnace the chlorine, which is introduced only in the lower hearths, and which acts upon the hearths in the lower alone, is excluded from the ore undergoing desulphurization in the upper hearth, in which nothing but the roasting goes on. When that is complete the charge of ore is let down through the traps into the center hearth, and thence into the lower one, being then in a condition free from sulphur. Separate fire-boxes provide for the requisite heat in each hearth, though the hearths may be so arranged as to be heated from a single fire-box. Each furnace is so built with respect to the adjoining ones that the fire-boxes lie close together for convenience in working.

On the top of the furnace, throughout its extent, is a track on which small ore cars are adapted to run. The workmen are protected when running the ear by an arch which carries the escaping gases above them. Doors are provided on opposite sides of the furnaces, and platforms are arranged for the workmen. By the peculiar construction of the upper arch over the tracks a dust-chamber is formed.

GEORGE HEARST and other San Francisco capitalists have representatives at Cœur d'Alene looking for good prospects.

Roasting Iron Sulphurets.

The roasting of iron sulphurets is a simple oxidizing process. The main object is to effect a perfect desulphurization, in order to set free the gold. Generally no loss of gold is suffered during the roasting, neither with iron pyrites, nor with arsenical pyrites, although exposed to a considerable heat and for a long time. Many manipulators, however, who have had much experience in roasting gold sulphurets, complain of considerable loss of gold with some kinds of sulphurets, which they could not avoid in spite of all experiments made with reference to heat and general treatment. It is therefore always advisable to investigate the loss of gold with new sulphurets by assay.

The simplest way to ascertain whether the loss occurs in roasting or otherwise, is to weigh out one-half ounce of the well-sampled and dried sulphurets before charging the furnace, then another half ounce after roasting. But the sulphurets, after roasting, weigh a great deal less than before, having exchanged the heavy sulphur for the lighter oxygen, and the

the nail as described, the time which would have been consumed in roasting is saved, and the result perfectly reliable; but samples of arsenical pyrites copper sulphurets, or iron pyrites containing arsenical pyrites, must be subjected to roasting.

The plan here detailed is that recommended by the late Guido Kustel. Iron sulphurets, well concentrated, require only a perfect oxidizing roasting to give a satisfactory result in the subsequent chlorination; but if lime, tale or clay is with the sulphurets, an addition of salt in small quantities, 20 to 40 pounds to the ton, is necessary, otherwise the precipitation of gold is sometimes very troublesome; and as the presence of salt is not injurious, it is always better to use some salt with the sulphurets. The quantity of salt must be increased if silver should be present. For the roasting of sulphurets, the reverberatory furnaces are usually used.

The Postal Telegraph.

Hon. Charles A. Sumner, M. C., has kindly sent us a print of his address to the House of

Disparaging Mines.

A gentleman came from the East not long since in the interest of certain capitalists to look into the condition of some mining property belonging to them in a Nevada district. He expresses himself as having been very much annoyed by parties who came to him soliciting him to buy mines from them, each one insisting in every instance that nobody's mine was good for anything except the one he offered for sale. However, he was not impressed favorably by having people run down every mine in the camp, as it looked as if all were worthless.

There is little doubt that altogether too much of this sort of thing is done. Let a man once think of buying a claim and he will hear all sorts of damaging statements about the property, circulated by people who have other claims to sell, or are jealous of the good fortune of their neighbors. They forget that in doing this they also hurt their own claims by injuring the reputation of the district. Almost every man who has had any experience in the mining camps of this coast knows that the sale

of a piece of mining property to capitalists who will develop it and put up works, is the one thing which brings a camp such prominence and gives it reputation. When one mine is thus sold, others are given a value they did not previously possess. We all know how camps have languished for years, until men of means came and bought a mine, that it immediately attracted general attention. But when a lot of miners deliberately set to work to abuse a property because it is going to be sold, they frighten off the intended purchasers, and not only do harm to the other mine owners, but to themselves as well. Of course every man has a right to do the best he can to sell or develop his property; but it is poor judgment to pull down somebody else's to build up his own. When a man hears every mine he looks at or knows of set down as worthless by others, he cannot tell when the truth is told. He naturally

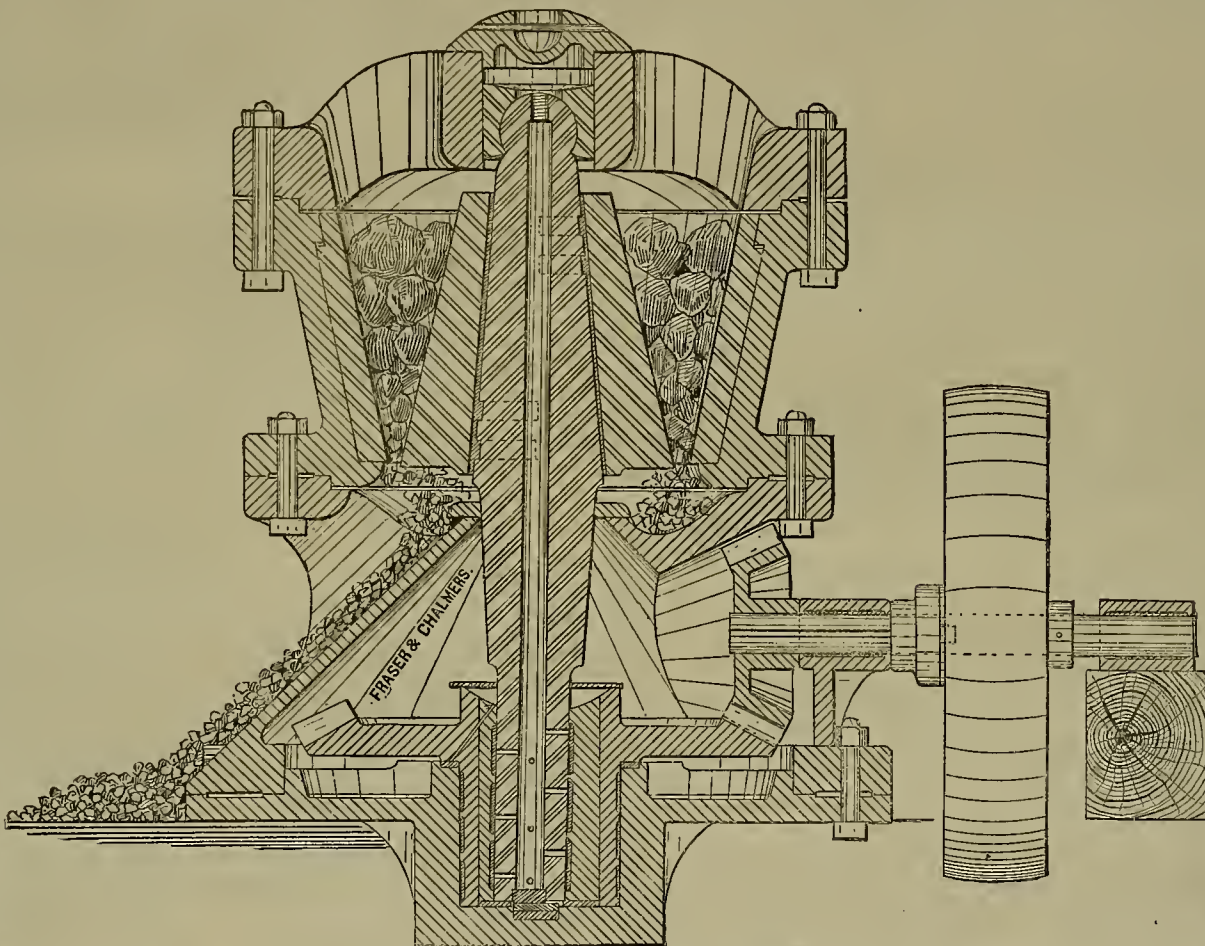
becomes suspicious of all. No doubt very great harm has been done more than once in this way by unthinking men, who, in endeavoring to help themselves, have hurt the whole community. People should be careful what they say under such circumstances. The mere hearsay of the camp is not always to be taken as the truth, by any means.

Comet Ore Crusher.

The engraving on this page is a sectional view of the Comet ore crusher, manufactured by Fraser & Chalmers, of Chicago. Some five sizes of these machines are made, to crush from four to sixty tons per hour. The discharge is quite large, so there is no clogging. The shoes and dies are removable. The construction and operation of this machine are quite plainly shown in the engraving, so that no detailed description is called for. The manufacturers intend the machine to crush not only ore, but street macadam, railroad ballast, etc.

FREIGHT on crude copper ore from Butte to Liverpool now is \$29 per ton. The former rate to Baltimore alone was \$43. Thus the difference in transportation charges goes far towards equalizing the depreciation in the market price of copper.

The lowest the mercury reached at Eagle City during the winter was twenty-two degrees below zero.



THE COMET ORE CRUSHING MACHINE.

gold, therefore, appears concentrated in the smaller weight of ore. For this reason it would be improper to take half an ounce of the concentrated and compare it with that of the original not concentrated sample.

In this case, if half an ounce of the roasted ore were assayed, the number of ounces would come out higher, and the actual loss either covered, or the gold would seem to increase in the furnace. If salt is used in roasting sulphurets, it is generally charged in the last hour, and the sample should be taken just before the salt is added.

The weighed sample of the raw sulphurets is introduced into a No. 8 French crucible, in which a mixture of one ounce of soda and one ounce of litharge are previously placed, and then carefully mixed with a glass or an iron rod. After this a 20-penny nail is inserted into the mixture, and the whole covered with about one ounce of borax. The other sample of roasted ore is also introduced into another crucible, having, in addition to the soda and litharge mixture, eight grains of powder of charcoal, well mixed, and covered with about one-half ounce of borax in small pieces, no nail being required. Both crucibles are exposed to a good heat in a furnace for fifteen minutes, the covers being taken off, the nail carefully taken out with the cupel tongs, the contents of the crucibles taken out and the buttons cupelled. Using

Representatives on the subject of the postal telegraph, from which we can see that he gave the old monopoly a pretty vigorous shaking up, and at the same time put in some strong points in favor of the new method of cheap communication. Among other things he showed by special report from the Superintendent of the British Government telegraphs that the British system has paid a considerable profit, that the public use of it has continually increased, and, in short, that the proposition as advanced in bills now before Congress is practicable as shown by actual experience in various countries. Of the disposition of the people toward the measure, he says: "The fact is, tested by the experience of Great Britain alone, that the establishment of a Government postal telegraph under such measure as the one before me would bring to the hearthstones of the people such enlarged facilities for intercommunication as a postal telegraph presumes and provides, with a small outlay supplied by the people themselves and gladly and joyfully paid into the Treasury of the United States; a comparatively trifling construction expenditure, to be ultimately and quickly returned from the profits of a telegraph line worked under the supervision of the Postmaster-General of the U. S." Again he says: "There is a picture of the political and the social and the intellectual and the moral advantages which would spring inevitably—ever-enlarging in their beneficence—from the establishment that is now sought at your hands. What a web of amity would be woven by this lacing and interlacing of electric wire!"

The Leaching Process.

An Experimental Working of Silver Ores.

J. H. Clemes, of Sonora, Mexico, read the following paper before the American Institute of Mining Engineers:

The process of leaching silver ores with sodium hyposulphite is comparatively new, and published accounts of the details and losses of the process are as yet very few. The following account of a careful series of experiments to determine the actual loss in this process may therefore be acceptable to members of the Institute.

The ore treated was highly calcareous, and the principal sulphide present was iron pyrites. Following is an analysis by Professor Price, of San Francisco, of the ore treated:

	Per cent.
Silica.....	15.31
Sulphur.....	13.31
Arsenic.....	9.82
Iron.....	17.33
Alumina.....	1.35
Zinc.....	4.92
Lead.....	1.78
Carbonate of lime.....	33.78
Magnesia.....	2.58

Total.....100.00
Ten tons were crushed dry with a 30 × 30 screen = 900 holes per square inch. In order to feel our way with this ore, two experimental or "pilot" charges were roasted.

Pilot Charge, No. 1.

Treated 1,000 pounds in a four-hearth reverberatory.

8:30 P. M.—Entered fourth hearth, remaining there one and one-half hours; sulphur began to burn.

10 P. M.—Changed to third hearth; ore became red-hot half an hour after entering; the fire-place was kept almost destitute of fuel.

2:30 A. M.—Changed to second hearth. Charge continued, giving off a large quantity of sulphurous fume; the fireplace was kept dark.

3:30 A. M.—The combustion of sulphur much decreased; the ore swelled a little.

4 A. M.—The mass began to lose its glow and to become dark.

Fuel was thrown on the grate-bars until the arch of the furnace was red.

4:30 A. M.—Combustion of sulphur ceased; 60 pounds of salt = 6 per cent were added. The salt was dry and finely sifted.

5 A. M.—Charge passed to first hearth, a small evolution of sulphurous acid still continuing. Although the fire was moderately urged, the chlorine fumes were not nearly as copious as could be wished.

5:30 A. M.—The amount of chlorine fume was very much decreased; the furnace was kept at a good red (*coup de feu*).

6 A. M.—The charge was considered rendered, and was drawn.

It evolved hardly any chlorine, even under a sharp fire—a marked difference from the siliceous ores that we generally treat here; the latter continue to give off chlorine fumes after being drawn, the cause being the action of the silica on the common salt, which is always present in excess.

The roasted ore assayed 245 milles = 71.5 Troy ounces per ton (2,000 pounds) avoirdupois.* By crucible assay, as often happens with ores in which the silver exists as chloride, the result by the scorification method is less; in this case the assay by the latter method was 215 milles.

Three portions of 300 grains each were treated with boiling concentrated sodium hyposulphite, and their residues assayed in the usual way; the buttons weighed .152 and .150 grains = 79 per cent and 80 per cent chloridized.

The pile was moistened and allowed to stand two days. Three hundred grains, treated as before, left a button weighing .138 grains = 81 per cent chloridized.

Pilot Charge, No. 1, b.

This was composed of:

	Pounds.
Pilot charge No. 1.....	900
Raw ore.....	200
Total.....	1,100

It was roasted in a five-hearth furnace.

3 P. M.—Entered fifth hearth.

4 P. M.—Changed to fourth hearth.

6 P. M.—Changed to third hearth.

7 P. M.—Entered second hearth.

Half an hour afterwards a very slight combustion of sulphur began.

8 P. M.—The mass received 4 per cent of salt and began to swell considerably.

8:30 P. M.—Changed to first hearth.

9 P. M.—The charge worked well, giving off a great deal of gas, swelling, and becoming spongy. A light fire was used.

10 P. M.—Strong evidence of active chlorination.

11 P. M.—The charge appeared to be rendered, and was withdrawn.

300 grains of the roasted pulp were digested with sodium hyposulphite; the residue yielded a button weighing 0.016 grains.

Repeated, 300 grains gave a button weighing 0.015 grains.

The roasted pulp was weighed after sprinkling:

First weight, 1,752 pounds; second weight, 1,730 pounds; deducting 9.88 per cent moisture = 1,569 pounds wet.

In its double passage through our furnace it

picked up other ores and dust from corners, etc.

200 pounds of this roasted pulp were placed in a small vat and treated with cold spring water for the purpose of dissolving out the soluble salts of base metals present in the pulp. A part of the liquid escaping from the bottom of the vat was caught in a bucket and the metallic salts held in solution were precipitated as sulphides by the addition of a little calcium sulphide.

The precipitate was dried, and yielded by assay 3.696 per cent silver; the operation was repeated half an hour afterwards, yielding a precipitate which contained 0.452 per cent silver.

Our usual working solution of hyposulphite was then turned on the pulp and allowed to run three days; specific gravity of solution, 2° B.

The tailings obtained assayed 7 milles = 2.04 ounces per ton of 2,000 pounds. The chlorination was further advanced by allowing the moistened pulp to lie heaped before leaching. It is still more advantageous, in addition to the above precaution, to allow the roasted ores to lie red hot as long as possible.

† It will be observed that a large loss of silver occurred in washing out the base metals, due to the solubility of silver chloride in brine. This loss will not be tolerated in treating eight and one-half ton lots, as the first wash will be suppressed. On the large scale, also, this loss can be avoided; further on we will describe the modes of effecting this.

(CONTINUED NEXT WEEK.)

Nickel.

The Ores of Nickel.

Nickel, next to iron, is one of the most universally disseminated metals. It is found not only in all the metalliferous regions of the known world, but also in the meteoric masses which fall to the earth's surface from the regions of space. Tissandier found it in the meteoric dust falling through the atmosphere, collected on a large porcelain surface, and its presence in the sun is revealed to us by the spectroscope. It thus enters into the composition of other worlds than ours; and probably pervades the solar system. But notwithstanding this universal distribution, and the apparent abundance of this element, it is only a few years since the metal was first separated from its impurities in commercial quantities and utilized in its pure state without alloy or contamination by sulphur, arsenic, or other elements with which it is universally combined in its natural state. It has never been found in a fine metallic condition.

Geographical Distribution.

The geographical distribution of the ores of nickel in the United States is more general than is commonly supposed. They occur in moderate quantity, in close association with chrome ores, in the serpentine rocks from Canada to Maryland, and equally so with the chrome ores of the Pacific coast, notably in Oregon. Dr. T. Sterry Hunt long ago pointed out the general diffusion of nickel throughout the magnesian rocks of the Quebec group. He directed attention to the fact that both chromium and nickel are almost always present in the serpentine rocks of the Green Mountain series in the same geological horizon as the serpentine of Canada and of Norway. He says, also, that the serpentines of Cornwall, the Vosges, Mount Rosa, and of many other regions agree in containing chromium and nickel, and these elements are also found in the Urchiefer, or primitive schists of Norway. Nickel is seldom or never absent from the serpentines, steatites, diallagas, and actinolites of the Quebec group, and is found also in the associated dolomites in traces and in very small quantities in the magnesian of Sutton and at Bolton, and in the Laurentian gneiss on the Assumption river.

The element is also found to be closely associated with iron terrestrially as well as in meteorites. Leaving out of view the great masses of metallic iron of Greenland (of which the Oviat mass containing nickel is a familiar example, and the meteoric origin of which is still in doubt,) we find that a nickeliferous limonite occurs in Lincoln county, North Carolina, and that similar ore is found in Michigan, from which a superior nickeliferous iron has been made. The spathic iron ore of Antwerp, New York, also contains nickel in the form of millerite, and no doubt many other examples might be found of the close terrestrial association of nickel and iron.

The ancient rocks of Michigan and the Lake Superior region are also found to contain many deposits of nickel, and several localities have been noted and partially explored, but none have yet been worked with commercial success.

Further evidence of the general diffusion of nickel, and of its abundance, in the Lake Superior region, is found in the results of analyses of the refined copper of Lake Superior. Eggleston has shown that it exists in the copper in small quantities.

In New Mexico there are localities which it is said will furnish considerable quantities of 8 per cent. ore, and important localities are known to exist in Oregon, California, and in Nevada.

The most abundant ore of nickel is in the form of a mixture with pyrrhotite or magnetic iron pyrites, which is found more abundantly in the older crystalline rocks than in those of later formation. This form of nickel ore occurs in Canada, Vermont, Connecticut, in the highlands of the Hudson in New Jersey, and in

Pennsylvania. It is abundant in Connecticut at Torrington and Litchfield, and in Pennsylvania at Lancaster Gap. These ores however seldom average over 2 per cent. of nickel as mined. Other nickel minerals of a higher percentage, but occurring in much smaller quantities, are found associated or occurring separately; as for example nicolite, containing about 44 per cent. of nickel and 56 per cent. of arsenic, at Chatham, Connecticut, together with herithanpate (nickel 31.43, timony 68.57) and chathamite, containing nickel 9 to 10 per cent., with arsenic, sulphur, and iron. At Finksburg, Carroll county, Maryland, the species siegenite (cobalt pyrites) occurs with chalcopryite, and it is cited as occurring also at Mine la Motte, Missouri. This species, which contains 29 to 30 per cent. of nickel, is found near Siegen, in Prussia, and in Sweden.

The presence of nickel in the serpentine rocks of Pennsylvania associated with chrome ores is well known by the beautiful green crusts on the massive chromite quarried at Wood's pit for the manufacture of bichromate of potash at Baltimore. These green crusts, known as "emerald nickel," consist chiefly of hydrous nickel carbonate, and are derived by infiltration from small granular nodules of nickel sulphide disseminated in the midst of a massive "violet talc" (kammererite) accompanying the chromite. Similar coatings of emerald nickel occur upon the chrome ores of southern Oregon and probably have a similar origin. This ore of nickel, though rich in the metal and very desirable, is not abundant enough to work, and has not been utilized except for cabinet specimens.

The most available ore of nickel and the only one worked up to this date in the United States is the sulphide, occurring in connection with magnetic pyrites. Although the amount of nickel rarely exceeds 3 per cent., the quantity of ore is so large and available and the sulphide ore is so readily smelted or enriched in nickel by roasting and matting that it is the most economical ore to treat for nickel. Until the discovery of large deposits of nickel silicate ore in New Caledonia, the sulphureted ore was the chief source of nickel in Europe and America, and it still continues to be worked. This is an ore which occurs at many places along the lines of the older or Archaean rocks, being found with the beds of pyrrhotite from Canada southward. The principal localities are, however, in Connecticut and Pennsylvania.

Recent Contributions to the California State Mining Bureau.

(Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANKE, State Mineralogist.)

[CATALOGUE.]

- 5216. Wad (Earthy Binoxide of Manganese)—Kingston, New Mexico. Jay G. Kelley.
- 5217. Calcite—Little Jimmy Mine, Kingston, New Mexico. Jay G. Kelley.
- 5218. Tanomina Gregaria (Con.), Upper Miocene Tertiary Fossil—Near Soledad, Monterey county, Cal. (Figured in Pale. Cal., Vol. II, Plate 13.)
- 5219. Boracic Acid—Manufactured from Borate of Lime, from Desert Springs, Kern county, Cal. (See Third Annual Report of State Mineralogist, folio 2, 6.) Manufactured and presented by the Boracic Acid Manufacturing Company, J. B. Hobson, Superintendent.
- 5220. Aragonite (so-called Onyx Marble)—From near Yreka, Siskiyou county, Cal. F. G. Henry.
- 5221. Cedro (Cedar)—Wood from Honduras. Presented by Mareo A. Soto, President of the Republic.
- 5222. Caoba (Mahogany)—Honduras wood. M. A. Soto.
- 5223. Grandillo (Rosewood)—Honduras wood. M. A. Soto.
- 5224. Zapotillo—Honduras wood. M. A. Soto.
- 5225. Mora (Mulberry)—Honduras wood. M. A. Soto.
- 5226. Coyote—Honduras wood. M. A. Soto.
- 5227. Ronron—Honduras wood. M. A. Soto.
- 5228. Madreale—Honduras wood. M. A. Soto.
- 5229. Biscuita—Honduras wood. M. A. Soto.
- 5230. Palo Negro (Black Wood)—Honduras. M. A. Soto.
- 5231. Cortez—Honduras wood. M. A. Soto.
- 5232. Balzamo (Balsam)—Honduras wood. M. A. Soto.
- 5233. Palo Blanco (White Wood)—Honduras. M. A. Soto.
- 5234. Nipero—Honduras wood. M. A. Soto.
- 5235. Tucuca—Honduras wood. M. A. Soto.
- 5236. Tumera—Honduras wood. M. A. Soto.
- 5237. Tincho—Honduras wood. M. A. Soto.
- 5238. Alencro—Honduras wood. M. A. Soto.
- 5239. Nanao—Honduras wood. M. A. Soto.
- 5240. Tiste—Honduras wood. M. A. Soto.
- 5241. Tototolo—Honduras wood. M. A. Soto.
- 5242. Baina Espada—Honduras wood. M. A. Soto.
- 5243. Guichepilla—Honduras wood. M. A. Soto.
- 5244. Chichicute—Honduras wood. M. A. Soto.
- 5245. Estoraque (Storax)—Honduras wood. M. A. Soto.
- 5246. Carreto—Honduras wood. M. A. Soto.
- 5247. Quilebrahacha—Honduras wood. M. A. Soto.
- 5248. Quebracho—Honduras wood. M. A. Soto.
- 5249. Roble (Oak)—Honduras wood. M. A. Soto.
- 5250. Copallito—Honduras wood. M. A. Soto.
- 5251. Madre Cacao—Honduras wood. M. A. Soto.
- 5252. Cedrillo—Honduras wood. M. A. Soto.
- 5253. Esquia—Honduras wood. M. A. Soto.
- 5254. Viruel de Montana (Mountain Flinn)—Honduras wood. M. A. Soto.
- 5255. Arallan—Honduras wood. M. A. Soto.
- 5256. Pachonillo—Honduras wood. M. A. Soto.
- 5257. Nacacole—Honduras wood. M. A. Soto.
- 5258. Quina Roja (Red Chichona)—Honduras wood. M. A. Soto.
- 5259. Maria—Honduras wood. M. A. Soto.
- 5260. Negro de Montana—Honduras wood. M. A. Soto.
- 5261. Tejapillo—Honduras wood. M. A. Soto.
- 5262. Palo de Arco (Bow Wood)—Honduras. M. A. Soto.
- 5263. Chichicute—Honduras wood. M. A. Soto.
- 5264. Uva (Sycamore)—Honduras wood. M. A. Soto.
- 5265. Pinientilla—Honduras wood. M. A. Soto.
- 5266. Chaparra—Honduras wood. M. A. Soto.
- 5267. Espino Verde (Green Thorn)—Honduras wood. M. A. Soto.
- 5268. Tototol—Honduras wood. M. A. Soto.
- 5269. Cedro Espino (Thorny Cedar)—Honduras wood. M. A. Soto.
- 5270. Oja Pendula—Honduras wood. M. A. Soto.
- 5271. Canille ne Tigre—Honduras wood. M. A. Soto.
- 5272. Guayacan (Liguamvite)—Honduras wood. M. A. Soto.
- 5273. Chaparra—Honduras wood. M. A. Soto.
- 5274. Nogal (Walnut)—Honduras wood. M. A. Soto.
- 5275. Macueliz—Honduras wood. M. A. Soto.

MINE BONDED.—The Merrimac mine at Lone Mountain has been bonded to San Francisco parties in the sum of \$10,000, and if nothing happens work will soon be commenced on the property and the mine opened out. It is undoubtedly a good mining property, and if thoroughly developed will show up with the best of them. It will also be the means of inducing the owners of other claims in the district to develop their prospects.—Bodie Free Press.

Barytes.

Productive Localities.

The leading producing localities in the United States are in the States of Virginia, East Tennessee, Missouri, Connecticut and North Carolina. Illinois, Kentucky, Maine, and Pennsylvania also produce barytes. It was formerly mined in New York, but the industry has latterly declined, as the cost of mining was too high to meet competition. The mineral commonly known as "heavy spar," "barytes," and sometimes as "baryta," is the barium sulphate (harite). Carbonate of barium (withierite, bromilite) is not mined in this country.

Mode of Manufacture.

Messrs. Paige & Krause, of St. Louis, who own important mines near the Osage river, Miller county, Missouri, report their process of manufacture as follows: (1) sorting the ores; (2) refining with sulphuric acid; (3) "floating" the refined product; (4) packing. The Marion Barytes Works, Smyth county, Virginia, produced 2,000 net tons in 1882. The mineral is here prepared for market by (1) separating from it the gray limestone and ferruginous impurities; then (2) washing and scouring in revolving cylinders; (3) hand sorting and grading; (4) grinding in buhr mills; (5) "air-floating," and finally (6) packing in barrels. The picking and sorting are performed by boys, of whom 50 are employed. The spot value of the crude barytes in this locality is, averaging all grades, about \$12 per ton of 2,000 pounds. The business of grinding barytes is an extensive one. German stone is imported and powdered here. Messrs. Burgess & Newton, of New Haven, Connecticut, report grinding 4,000 tons of German barytes in 1882.

Production.

The following table shows the production of ground barytes in the census year 1880. It includes, however, the foreign stone which was treated in this country.

PRODUCTION OF GROUND BARYTES DURING THE CENSUS YEAR 1880.

States.	Quantities—Tons.	Values.
Connecticut.....	6,000	\$150,000
Maine.....	2,200	50,000
Missouri.....	4,425	100,000
Pennsylvania.....	1,500	20,000
Tennessee.....	465	10,485
Virginia.....	4,575	41,650
Total.....	19,165	\$371,820

The production of crude mineral in the United States in 1882 is estimated by Messrs. Page & Krause at 20,000 tons, and that of Missouri alone at 8,000 tons; and it is stated that the production could be largely increased to meet an augmented demand. The mine owned by Messrs. Davis & Hewitt, near Irvington Station, Campbell county, Virginia, reports a capacity of from 100 to 200 tons per day, and other mines also could produce more largely than at present. It is difficult to fix the average spot value for the crude mineral. Ground barytes in 1882 averaged about \$22 per ton, and the value of the crude may roughly be placed at \$8 per ton, at the point of manufacture, making a total value for the crude mineral of \$160,000.

Utilization.

Barytes is used very extensively in the arts, but almost altogether for purposes of adulteration, for which its leading use (about 90 per cent) is in replacing to a greater or less extent white lead in paint. One firm claims that a mixture of one-third white lead, one-third oxide of zinc, and one-third "floats" barytes makes a better paint than pure white lead. Paint works, however, do not generally advertise the fact that their product contains barytes, although this is, of course, well understood in the wholesale trade. It is also employed as a "filling" for general purposes, in pulp, and in making putty.

Tariff.

The duty under the new tariff on crude barytes is 10 per centum ad valorem, and on manufactured barytes one-fourth of 1 cent per pound. Of the imported carbonate 75 per cent. is used in the paint trade, and the remainder chiefly in pottery making.

SWEETWATER NEWS.—The saloons are all closed, and there is but one store with a small stock. There is at present very little money in the camp, and provisions are scarce. The weather for some time has been very fine, and it is hoped that it will continue so. Sweetwater is a good district and contains some fine prospects, among which are the Great Western, Lookout, North Star, California Comstock, Index, Kentuck, Silverado, Homestake and Lady Hays. There will be two or three mills built in the district during the coming summer, one of five stamps, in Silverado canyon, and one of ten stamps, in Sweetwater canyon. There is also some talk of one on the California Comstock. The prospects are such that we will have a very fair camp next summer. The snow is four feet deep on the level, and drifts from ten to 100 feet. We have not seen a team for more than a month and if we wish to visit our neighbors we must carry shovels to prevent getting snowbound; but, under all the difficulties, we have a good time, as all we have to do is to shovel snow, eat, sleep and dance.—Walker Lake Bulletin.

* As 1 mille is taken = 0.001 per cent, the above assay is, therefore, 0.245 per cent, or, as is often written, 245 grams per 100 kilograms.

ENGINEERING NOTES.

UTILIZING NIAGARA FALLS.—There seems, at last, to be a definite plan and determination to at least partially utilize Niagara Falls. Reports from Lockport, New York, of March 18th, says: Colonel Leonard Henkle, the inventor of a system of electric lighting which he proposes to transmit to sixty-five cities in the United States, from central batteries stationed at Niagara Falls, and run by the immense water power there, was interviewed in this city to-day by reporters. On Sunday he received a letter from a Chicago banker, who has taken \$1,000,000 of the stock, stating that he was soon coming east to Baltimore, which city he would make his headquarters. He will there take charge of the company and form a syndicate in New York City to go on with the work. Colonel Henkle is now having a cottage built at Niagara Falls, which will be ready for his occupancy in May, and he will then go there to superintend the work of erecting buildings for the batteries and digging a canal to obtain the water power. The power will be transmitted in a silver wire about the size of a straw, laid underground, inclosed in heavy pipes made of asphaltum. Such a wire, the Colonel states, can, with a forty-foot battery at the Niagara Falls end, transmit in four hours to Rochester enough electricity to light that city for twelve hours. The sixty-five cities are all over 30,000 population. Lockport and Buffalo will probably be the first places where he will introduce his apparatus as experimental points, and he expects that he will be able to make those experiments next fall. By a properly-constructed means for conservation of electric energy, he expects to overcome the resistance usually found in transmitting currents through long distances.

THE CAPE COD CANAL COMPANY have begun night work by the aid of the electric light, and have contracted with the American Electric and Illuminating Company to supply the necessary machinery and lamps of the Thompson-Houston system for this purpose. The necessity for this canal is well set forth in a long article in the Boston Herald, which, among other things in connection with the canal traffic, says: "Barges carrying 1,500 to 2,000 tons can be built for \$10,000, and require only three men to 'man' them, while a schooner carrying 500 tons costs from \$30,000 to \$40,000, and takes seven men to 'man' it. The barge is towed with half a dozen others, and is very seldom delayed. As a general rule, it can be depended upon in a day or two after shipment. But not so with the schooner. Adverse winds cause it to 'lay to,' and it is not unusual for one firm to have at one time 20 vessels, carrying upward of 10,000 tons of coal, consigned to different parties, lying at 'Holmes Hole' for a month, awaiting a change of wind, with a numerous fleet to keep them company, resulting in severe 'demurrage,' as all would arrive at their destination the same day."

AROUND THE WORLD BY STEAM.—It is seriously proposed to construct a railroad to Alaska, to connect, by ferry-boat across Behring's strait, with the Siberian Railroad system now being constructed by Russia. Such a scheme may be a visionary one just at this time; but that it will eventually be realized, and that within 50 years, is much more probable than was the construction of a railroad from the Missouri to the Pacific 30 years ago. The Russians are actually building a road across Siberia, and within 10 or 12 years the locomotive will reach one of their Pacific ports. When that is accomplished, a road from this side to meet it will become a prime necessity.

A NOVEL BREAKWATER has been built at Brighton, Eng., which is said to be both efficient and cheap. It consists of a line of buoys of triangular shape, with a sharp edge or prow toward the sea, and two concave sides. They are moored by an anchor fore and aft, each independently, and the width of a buoy between them. As each wave strikes them it is cleft in two and diverted right and left against the next buoy; and so the momentum of the waves is used, one to neutralize that of another, and it is claimed that the more violent the waves the more effectual is the action of the buoys.

THE PANAMA CANAL.—The actual situation of affairs upon the Panama canal, according to the *Revue Scientifique*, is as follows: Out of the 90,000,000 cubic meters of material that must be excavated, only 2,500,000 were removed by the 15th of October last, at which date more than 10,000 workmen were employed; but it is expected that, now that the bad season is over, 4,000,000 cubic meters will be taken out per month, while the working force will be increased to 15,000. The port at Colon is almost finished. We may still hope, adds the writer, that 1889 will see the inauguration of the Panama canal.

A NEW CABLE LINE SYSTEM.—A new system of cable line railway is to be tried in Idaho, between Hailey, the northern terminus of the Wood river branch of the Oregon Short Line, and Ketchum, a town 10½ miles distant. The pulleys carrying the cable will be above the track, which is of three-foot gauge. The necessary power is derived from the current of the Wood river, at a point where the water has a velocity of flow of 65 feet per minute.

USEFUL INFORMATION.

Simple Tests for the Purity of Water.

In suspected potable water for persons who cannot command chemical analysis, the following tests are recommended, as being generally available and reliable:

Color. Fill a bottle made of colorless glass with the water; look through the water at some black object. The water should appear perfectly colorless and free from suspended matter. A muddy or turbid appearance indicates the presence of soluble organic matter, or of soluble matter in suspension. It should be "clear as crystal."

Odor. Empty out some of the water, leaving the bottle half full; cork up the bottle and place it for a few hours in a warm place; shake up the water, remove the cork, and critically smell the air contained in the bottle. If it has any smell, and especially if the odor is in the least repulsive, the water should be rejected for domestic use. By heating the water to boiling an odor is evolved sometimes that otherwise does not appear.

Taste. Water fresh from the well is usually tasteless, even though it may contain a large amount of putrescible organic matter. Water for domestic use should be perfectly tasteless, and remain so even after it has been warmed, since warming often develops a taste in water which is tasteless when cold. If the water at any time has a repulsive, or even disagreeable taste, it should be rejected.

Heisch's Test for Sewage Contamination.—The delicacy of the sense of smell or taste varies greatly in different individuals. One person may fail to detect the foul contamination of a given water, which would be very evident to a person of a finer organization. But if the cause of a bad smell or taste exists in the water, the injurious effect on health will remain the same whether recognized or not. Moreover, some water of very dangerous quality will fail to give any indication by smell or taste. For these reasons I attach special importance to Heisch's test for sewage contamination or the presence of putrescible organic matter. The test is so simple that any one can use it. Fill a clean pint bottle three-fourths full of the water to be tested, and dissolve in the water a teaspoonful of the purest sugar (loaf or granulated sugar will answer), cork the bottle and place it in a warm place for two days. If in 24 to 48 hours the water becomes cloudy or muddy, it is unfit for domestic use. If it remains perfectly clear it is probably safe to use.

The Oil Stone.

The *Scientific American* says that twenty years ago the oil stone was found only on the joiner's bench and possibly on that of the machinist, and its sole use was the sharpening of the edges of tools. To-day its use has extended beyond this province of edging tools to that of grinding, reducing, finishing; in fact, invading the limits of the grindstone, emery, rottenstone, tripoli, and reaching almost to rouge. This stone, which is a slate known in science as novaculite—from *novacula*, a razor—is cut and dressed in hundreds of varying forms for differing purposes. In any hardware or mechanic furnishing store it may be found in all manner of shapes under the name of "slips," adapted for sharpening tools of all forms. In dentists' supply stores it may be seen in twenty or more cylindrical and circular forms, and so minute as to be used at a rapid rate of revolution even between the teeth of dental-suffering humanity. Some of these cylinders, ovoids, cones and edged wheels are so minute that a pea looks large by their side; yet they are all veritable grindstones.

In the manufacture and finishing of the metals, the oil stone, or novaculite, plays an important part. Our recent exaction as to fits and measures can hardly be filled except by the use of this stone, and it is in demand for trueing turned surfaces and planed areas of iron and brass, slowly grinding down the imperfections left by the finish file and the corundum wheel. Recently its powder has largely usurped the place in mechanics' valuation of flour of emery or emery of the highest grades. It is found that a finish "for fit" can be readily obtained by its use in much less time than that by the scraper; and that it does not leave embedded particles of quartz or corundum to keep up a perpetual wear. This material is not strictly an oil stone; it can be used with any vehicle, water, benzine, or kerosene oil; it is amenable to all of these. Perhaps its best use is with water, especially when the stone is of the harder sorts, as the Onachita.

To coat cast iron a glossy black color that will stand washing and heat, take oil of turpentine and add to it strong sulphuric acid, drop by drop, while stirring, until a syrupy precipitate is formed and no more of it is produced on further addition of a drop of acid. The liquid is now repeatedly washed away with water, every time renewed after a good stirring, until the water does not exhibit any more acid reaction with blue litmus paper. The precipitate is next brought upon a cloth filter, and after all the water has run off, the syrup is fit for use. This thickish deposit is painted over the iron with a brush; if it happens to be too stiff, it is previously diluted with some oil of turpentine. Immediately after the iron has

been painted, the paint is burned in by a gentle heat, and after cooling, the black surface is rubbed over with a piece of linen stuff dipped in and moistened with linseed oil.

SAVED BY OIL.—The use of oil in quieting a rough sea is rapidly coming into general practice by navigators. The latest case we have notice of is the following: The steam whaler *Jan Mayen*, which left Dundee in February to proceed to the Newfoundland seal fishing, returned to Scotland, having been unable to proceed on her voyage owing to stormy weather. On Monday, Feb. 18th, the vessel encountered a hurricane, in which she was thrown on her beam ends, and would, it is believed by the crew, have foundered had not the use of oil been resorted to. Three bags filled with oakum saturated in oil were hung over the side of the vessel, and in a brief space the sea, which had been washing completely over the ship, ceased to break. The captain attributes the escape of the vessel to this experiment.

TO REMOVE CLINKER IN STOVES.—The coal is to blame for the formation of clinker. The constituents of the ash of certain coals, and sometimes the stony impurities from which the coal has not been carefully freed, will, when the fire is very intense, fuse down more or less completely, and form the mass known as clinker, which becomes especially troublesome when it attaches itself to the fire brick lining of the fire-space, from which it can only be removed by the use of the hammer, and unless very carefully performed this operation is likely to fracture the bricks. The only way to avoid the annoyance of clinker is to dispense in future with a coal that is known to form it.

TO REMOVE the unpleasant taste which is frequently observable from new wooden vessels is a thing difficult of accomplishment. The *Brewing World* says that the simplest plan, and one that will succeed in most cases, is to scald them thoroughly several times in boiling water; then dissolve some pearl-ash or soda in lukewarm water, adding a little lime to it, then wash the inside of the vessel well in the solution. Afterward scald them several times thoroughly as before.

TO CLEAN marble, mix one quart of a pound of soft soap with the same of pounded whiting, one ounce of soda, and a piece of stone blue the size of a walnut; boil these together for fifteen minutes, and then, while hot, rub it over the marble with a piece of flannel and leave it on for twenty-four hours; then wash it off with clean water, and polish the marble with a piece of coarse flannel, or what is better, a piece of an old hat.

GOOD HEALTH.

Charcoal.

An Iowa correspondent, who says that he is a "nervous dyspeptic," a "regular old chronic back-slitter for fifteen years," asks the following questions respecting charcoal:

1. Is one kind of wood better than another for charcoal?
2. How is it best prepared and kept for use?
3. How much is a dose?
4. When best taken, before or after meals?

ANSWER. 1. The best charcoal for medicinal purposes is that made from hard wood. Charcoal from lignum-vita, or box wood, or the shells of cocoanuts, is superior to that made from other woods. Very excellent charcoal, however, is made from hard maple. We have been experimenting with charcoal made from hickory, for some months, and are thus far better pleased with it than with any other which we have ever tried. The best charcoal obtainable at drug stores is willow charcoal.

2. It should be thoroughly burned. The ordinary charcoal requires to be burned the second time before it is fit for use. It should be ground to a fine powder, like flour, and kept in tight bottles.

3. A dose may be from one-third of a teaspoonful, to two teaspoonfuls. It is best taken in gelatine capsules, or in water. When taken in water, the charcoal should be placed in a tumbler, and a few drops of water added, sufficient to make a thick paste. One or two teaspoonfuls of water may then be added, and the whole stirred up and taken at a single dose.

4. Charcoal, when taken to relieve acid dyspepsia, or to prevent fermentation or flatulence, should be taken within one-half hour after eating.

The Dangerous Fly.

We have had much sympathy for the fly, says *Good Health*, believing the little creature to be a pretty good sanitation on account of the avidity with which it devours germs, as it consumes prodigious numbers of them; but if what Dr. Grassi says of these little creatures is true, we must cease to defend them, and begin a war of extermination. We present the following facts at the present time, so as to give an opportunity to prepare for protection against these newly discovered enemies of life and health:

It was always recognized that these insects might carry the germs of infection on their wings or feet, but it was not known that they

are capable of taking in at the mouth such objects as the ova of various worms, and of discharging them again unchanged in their feces. This point has now been established, and several striking experiments illustrate it. Dr. Grassi exposed in his laboratory a plate containing a great number of the eggs of a human parasite, the *trichocephalus dispar*. Some sheets of white paper were placed in the kitchen, which stands about ten meters from the laboratory. After some hours the usual little spots produced by the feces of flies were found on the paper. These spots, when examined by the microscope, were found to contain some of the eggs of the *trichocephalus*. Some of the flies themselves were then caught, and their intestines presented large numbers of the ova. Similar experiments with the ova of the *oxyuris vermicularis* and of the *tenia solium*, afforded corresponding results. Soon after the flies had some moldy cream, the *odium lactis* was found in their feces. Dr. Grassi mentions an innocuous, and yet conclusive, experiment that every one can try. Sprinkle a little lycopodium on sweet-cured water, and afterwards examine the feces and intestines of the flies; numerous spores will be found. As flies are by no means particular in choosing either a place to feed or a place to defecate, often selecting meat or food for the purpose, a somewhat alarming vision of possible consequences is raised. Dr. Grassi invites the attention of naturalists to the subject, and hopes that some effectual means of destroying flies may be discovered.

HOW TO GIVE AN OIL-BATH.—The oil-bath should always follow another bath of some sort. It may be a tepid sponge, a hot sponge, a saline sponge, tepid or hot, a salt glow, or almost any other form of bath. While the skin is still moist and supple from the bath, the oil should be applied and well rubbed in. It is well to begin with the extremities, so as to secure a thorough circulation of blood in them. The oil should be rubbed in by friction of the surface, and gentle kneading with a movement similar to that employed by fullers in working their goods. After the whole surface has been treated in this manner, the flesh should be wiped with a clean, dry towel to remove any surplus of oil. The best oil for this use is refined cocoanut oil. It cannot usually be obtained at drug stores in a fresh condition, but should never be used when in the least tainted with the odor of decomposition. It may be obtained in quantity of druggists in the large cities, and if kept in a cool place, and covered with lime-water, will remain sweet for a long time. It may also be preserved by melting and corking tightly in small bottles, each of which should contain only a sufficient quantity for a single bath. Pure olive oil is also excellent for this purpose, but it is less limpid and agreeable to most patients than cocoanut oil. Vaseline, cosmoline, oil of petiole, and other petroleum products, are not to be recommended. Most unwholesome of all is lard in any form. Cottonseed oil is not objectionable to some, but we have reason for entertaining the suspicion that cottonseed oil is somewhat irritating in character.—*Good Health*.

WHY WE EAT.—We eat our dinner because, in the food of which that meal consists, we expect to find materials capable of replacing those we have lost in the acts and processes of life. "Food," in this view, from dry bread to Smith's choicest dainties, is only matter which the body demands for its sustenance and support; and the perfect diet is simply that which affords us the most complete epitome of our bodily belongings in most condensed form, and in a shape susceptible of ready conversion, by digestion, into ourselves. We eat, then, because we waste, and we waste because we work. There is no escape from the continual wear and tear which besets us. We receive so much food as income, and we exert so much force and give off waste matters as expenditure, our profit in this transaction consisting of the "energy" or power of doing work we obtain from our food. It is true that we eat to live; it would be a truer statement if we said that we eat to work. We begin our physiological career with work, and our dinners are the consequence of our exertion. There is, after all, a considerable savor of an admirable social philosophy in this view of matters. The knowledge that these frames of ours periodically make reasonable and natural demands, through hunger and thirst, for the wherewithal of life and work, seems to lead to the plain conclusion that they deserve good and wise treatment. There can be no hesitation in indorsing the statement that living well means, other things being equal, living long.—*Belgravia*.

A DANGEROUS WEED.—Everywhere in Mexico one finds the poisonous weed toloache, though it grows most thrifty in the tropical lowlands of the tierra caliente. It is a harmless looking plant, much resembling northern milk weed, and quite too dangerously common in a land where suspicion rules and jealousy amounts to madness. It does not kill, but immediately acts upon the brain, producing first violent insanity, and then hopeless idiocy. A few drops of the tasteless fluid, mixed with milk or other food, does the diabolical work with inexorable certainty, and cannot be detected except in its effects. It is whispered that poor Charlotte had hardly landed at Vera Cruz, on her sorrowful mission to this country, before it was administered to her, and her desolate fate is cited as one among many instances. Of all the dangers in Mexico this is one of the most appalling.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

SOUTH SPRING HILL.—Amador Ledger, March 29: This mine is increasing the number of employees. They have 12 miners at work underground. The mill is to be run to its full capacity seven days in the week. Hitherto there has been no milling done on Sundays. A commodious blacksmith shop has been erected close to the shaft, and two forges are kept going pretty steadily. The mine continues to look splendidly.

MISCELLANEOUS.—The Bunker Hill gives employment to about 70 men—more than at any time in its past history. It is paying better than it ever did. Indeed, all appearances indicate that the mine has a long career of prosperity before it. The 10-stamp mill is running steadily. About a ton and a half of sulphurets are turned out daily, which are sent to the Stewart reduction works for treatment. Reports are afloat to the effect that ore equal in richness to any heretofore taken out, was extracted last week from the upper tunnel of the Mammoth mine. It requires an expert in the character of quartz met with in that section to tell good rock when he sees it. Practical miners from other parts are at sea when inspecting a mine like the Mammoth. Mr. Nevills, however, is so thoroughly acquainted by actual experience with that sort of gold-bearing rock, that he can tell unerringly when an approach is being made to a pocket. It is generally believed that there is plenty of the richest kind of rock at various points in the tunnel waiting to be taken out when the proper moment arrives. A few days ago a chunk of ore was taken out worth several hundred dollars, and which to many experts would seem to be almost worthless, but when submitted to the action of the fire the precious metal ran out in a stream. At the St. Julian they are sinking a shaft in the tunnel, close to the pocket, for the purpose of taking out the rich ore known to lie below the tunnel level. The mill is running on the mixture of slate and quartz, which is said to be turning out handsomely. Ten tons of quartz from the Lighthouse mine near Butte City, and owned by W. E. Stewart, was crushed at the Confidence mill last week, and yielded over \$6 per ton.

Calaveras.

ANOTHER GOOD PROSPECT.—Calaveras Prospect, March 29: The claim on Bear mountain known as the Thorn mine will be put in shape soon for another season of work. Some two years ago the prospectors struck some very rich pockets and such findings continued for a time. Since the 6th of last September prospecting has been carried on quite actively and the indications for pockets are better than ever. But owing to the heavy rains work has been suspended until the surface water drains off, when the owners will sink a shaft near where the rich pockets were found. The present owners are C. W. Slayton, B. K. Thorn, Walter Knight and D. J. Demarini.

GOOD DISTRICT.—Mountain Echo, March 26: I heard it expressed by a competent quartz miner a few days ago, that in his opinion this is one of the best quartz districts in the county. He thought all we need is a few enterprising men who have capital and are not afraid to invest it; he went on to reason thus: "Let a man go to work with one thousand dollars, or probably less, (as most of them do around here) and nine times in ten his money is all gone before he gets any returns to speak of, and finally he gives up greatly discouraged; while on the other hand, let the right man take hold of most any of our quartz mines with capital to back him and a determination to go to the bottom, whether he makes or breaks, nine times in ten he will come out successfully." Most undoubtedly his theory is the right one. Since the last heavy rain storm, quartz prospecting has been carried on pretty generally, and we anticipate hearing of some big discoveries before long. Work on all the principle placer mines in this vicinity is being urged forward with encouraging results and the area of development is being steadily enlarged. It is reported that George Osborn has unearthed another rich deposit in the Gold Hill mine. A piece of gold weighing four ounces was picked up by an Indian on San Antonio creek, last week. We are credibly informed that work will soon be resumed in Bully Bully mine at Dogtown. This mine is one of the "has beens" and may be again.

GLENCOE.—Calaveras Chronicle, March 24: At a meeting of the miners of this district, held on the 20th inst., the District Mining Laws and the office of the District Recorder were abolished, and the records ordered to be placed in the office of the County Clerk at San Andreas by the President of the "Glencoe Miner's Protective Association," in whose charge they were ordered placed for such disposition.

Nevada.

STRUCK A BONANZA.—Transcript, March 27: What is described as the richest free gold ore ever found in Washington township was struck last Friday at a point 190 ft below the tunnel of the Yuba mine, to which depth the incline has been sunk since last August. The ledge is between six and seven ft wide, and increases in richness as it goes down. When the incline was started last fall it was intended to sink only 100 ft before drifting, but when that depth was attained the ledge was so large and valuable that the management could not resist the temptation to follow it down without loss of time and see how far down the good prospect continued. The Eagle Bird mine, situated near the Yuba, is said to also be looking very fine. Reliable men say that locality is going to take its place as one of the best quartz mining districts on the Coast.

BLUE LEAD.—Nevada Transcript, April 2: The pumping and hoisting machinery formerly used on the Blue Lead mine is now being put up on the Rising Sun claim, which latter promising property is situated on Deer creek east of the Murchie. The works will be run by an undershot wheel. Thirty eight men are working at the Merfield, and the prospects are encouraging. In two weeks more the water will all have been pumped out, and then the

shaft is to be sunk 50 ft deeper (giving a total depth of 950 ft) and a new level will be opened. The Neversweat is the comical name that Messrs. Lyons True and the Goyne brothers have given their claim which lies to the east of the Deadwood. A recent crushing of the ore paid \$52 a ton. Hoisting and pumping works are to be put on the Neversweat soon. The 16 stamp mill at the Wyoming is worked to its fullest capacity, and the returns are large. An old miner said yesterday, "The Wyoming is one of the best quartz claims in the county. From the 200 level to the 700 there are immense deposits of rich ore extending for hundreds of ft, and without opening another ft of ground the present mill would not be able to crush all the pay quartz in several years." At the Hussey mine in Willow valley, drifts have been started at the 200 level. The ledge in one drift is 40 inches thick and in the other three ft, and is of high grade ore. A contract will soon be let to drive the west drift ahead fifty ft. The ore now coming out is of good quality, and a crushing will be taken to the mill as soon as the roads get in good condition for hauling. Cars are being built, and if the indications continue as good as they are at present the mine will soon be worked on an extensive scale.

WILL RESUME WORK.—Transcript, April 2: It has been stated within the past few days that the lessees of the Golden Gate gravel mine at Smartsville, Ganney, Madden & Co., had obtained permission from the Superior Court of Yuba county to wash up a certain piece of ground for the purpose of paying off certain liabilities on condition that restraining dams should be put in to take care of the debris. There seems to be some truth in this as it is understood preparations are being made to commence work.

Mono.

BODIE CON.—Free Press, March 25: The west crosscut from the shaft, 200-foot level, has been advanced during the past week 14 feet, total length, 81 feet, and shows no change in the character of the ground cut through. The north drift has been driven 25 feet, showing 2½ feet of ore. Winze No. 2 has reached a depth of 35 feet. The vein at this point is 4 feet wide. The upraise on the Gidea shows the vein to be 8 feet wide. Upraise No. 1, 306-foot level, is up 14 feet, with no change to report. They have also started another west crosscut 80 feet south of crosscut No. 1. It has not yet reached the vein. North upraise, 432-foot level, is up 85 feet, showing the vein 1½ feet wide.

STANDARD CON. During the past week there were shipped to the company \$13,853 93. North drift, 700-foot level, is in 160 feet; progress 6 feet. The vein is 6 feet wide. South drift No. 4 from east crosscut No. 2 is in 12 feet, having been started during the week. The vein is 2 feet wide.

MONO.—Have been working with all possible expedition to get the machinery in proper condition for hoisting from the lower levels. A good deal of interest centers upon a section of ground which will be thoroughly prospected at once. They began hoisting last night.

SYNDICATE.—The mill is pounding away incessantly, except short interruptions for the weekly clean-up. Last week the company shipped \$6,000 to the Carson mint, which is slightly under the usual shipment.

A GOOD PROSPECT.—Homer Index, March 26: Wm. L. Callahan and Charles A. Wetmore having lost their joint tunnel in the Mariposa-Coyote claims, Jordan district, in the late snowsides, resumed work on their joint shaft, and at a depth of 55 ft have struck it rich, though as yet they are unable to tell the width of the vein, as neither wall has been encountered. They are now engaged in drifting along the ledge to get away from the disturbed portion under the ravine in which the shaft was sunk, and will soon crosscut both ways to ascertain its width. The ore is rich in free gold, carries both chloride and bromide of silver and shows traces of copper.

Placer.

NOT RUNNING.—Placer Argus, March 29: The Sacramento Bee keeps up its howl about hydraulic mining, and says that claims are being worked at Dutch Flat and Gold Run. Now the fact is that notwithstanding there has been a good fall of snow and rain this season, there has not been a water supply at either of the above named places to wash away earth enough to shoal a brooklet. For this reason, the heavy falls of snow and hard freezing at night above here have choked up the ditches and kept the water from running through to the reservoirs. The water supply up to this date has not been sufficient to keep the pulp mill in steady operation at Fowl's Mills. It is true that a few small claims might run, two or three hours a day, and work in a scratching way, as miners term it, but if so they would not wash away any more dirt than if mining by the drifting process, and large claims would not go to the heavy expense of fitting up and would not be bothered running if already fitted up. On such a meagre supply of water they could not pay wages with three or even six hours water per day—and it is fair to presume that miners are not going to work when they know they can not pay expenses.

Plumas.

TUNNEL.—Greenville Bulletin, March 26: Supt. Standart has had a few men at work for some time, running a tunnel on ground belonging to the Cherokee mine. A ledge was struck recently and some good ore found. The extent of the ledge is not yet known. The proprietors of the Eagle Gulch mine are now well advanced with a tunnel that will tap their ledge at a depth of 300 ft. The ditch will be opened to Green Mountain by to-morrow, and water will at once be turned in. Water power will then be applied to the air compressor, and steam will be dispensed with. It is not expected that the mill will be started before the first of the month. During the past week the Blake chimney has been showing up some better ore than hitherto. The prospect is good.

Sierra.

COMMENCED CRUSHING.—Tribune, March 29: Twenty-stamps of the new Sierra Buttes mill commenced crushing last week Tuesday. It is the intention of the Company to enlarge the capacity of this mill to 60 and possibly to 80 stamps as soon as the lower levels are opened sufficiently to warrant it.

RUBY.—Mountain Messenger, March 26: We hear that the Ruby Company is taking out about \$1,200 per week. The bedrock is hard and requires blasting; they are yet below grade and the water, gravel, etc., has to be raised; the gravel has to be run to the dump by hand, all of which disadvantages

entail extraordinary expense that will in time be avoided, it is hoped.

Shasta.

THE CLEAR CREEK DITCH.—Shasta Courier, March 26: Great activity prevails in the matter of locating claims under the Clear creek ditch, now that the work of putting it in repair has assumed shape. This ditch extends from the Tower House to Horsetown and with its sinuosities and side ditches, has a length of 40 miles. When in good order it carries many hundred inches of water and has on its line many reservoirs, which, when filled, assume the proportions of good sized lakes. Besides the large amount of mineral ground lying below it, there are hundreds of acres of land, which, with facilities for moderate irrigation, would produce excellent fruit, grapes and vegetables.

San Bernardino.

MINERAL LAKE DISTRICT.—Calico-Print, March 2: Mr. H. B. Stevens returned from the above named district on the 13th inst. Work on his mine, the Carbonate, is progressing in a satisfactory manner and has reached a depth of 50 ft, the vein showing a width of 10 ft all the way down. They have a car-load of ore at the railroad depot at Bagdad ready to forward to Pueblo. His is similar to the lot mentioned in our last weeks issue, 20 sacks of which yielded a return of \$116 per ton in silver and 20 per cent copper. The ore of this shipment is equally as good. Mr. Stevens has also received returns from the carload of Kearsage ore mentioned as shipped from here January 29th. They are as follow: First class ore \$1,100 per ton; allowed 95 per cent of assay value. Second class, \$448, allowed 94 per cent. Third class, \$280, allowed 93 per cent. He now asks, "Who is it that is not satisfied with that?"

WEST LAVA BEDS.—Day before yesterday Messrs McGlinchy & Keyes returned from the West Lava Beds where they have been working on the United States mine. They say the appearance of the ledge in the shaft they are sinking is looking well, and they feel encouraged that this claim may open up into a good mine. They say that the De Soto is looking splendidly and is improving as work progresses. They brought up a nice looking specimen from this mine which represents ore that will mill about \$500 per ton. They stated that Messrs. Reed & Vine have sunk 14 ft on the Garfield claim and have suspended work until they get a windlass, and are now working on the Stoneman in that vicinity. Mr. Smith and two men are at work on the Columbus and have every encouragement to expect rich returns from their labors. Messrs. McGlinchy & Keyes think that the Lava Beds is destined to be a large and flourishing camp, and that the mines there have the appearance of permanency and remarkable richness. The principal ledge can be traced for four or five miles and ore has been found in many places, some of it assaying very high, and the samples averaging more than an ordinary grade.

MORNING STAR.—Mr. I. H. Roberts, Supt. of the Morning Star mine in Lava Beds districts, called at our office the other day and presented us with three large and exceedingly rich specimens of silver ore from the above mine, which are the finest specimens we have seen from mines in this county. Work on the Morning Star is still progressing, the tunnel being run in along the vein a distance of 180 ft, the appearance of the mine improving as they advance. They intend to crosscut the ledge and continue the tunnel. There are a good many tons of ore on the dumps awaiting the erection of the sampling works that are expected to be put up in Daggett in the near future.

SPECIMENS.—Mr. S. P. Clark arrived in town from the Lava Beds last Tuesday and brought with him a specimen of rich ore from a new strike he made a few days ago on the Meteor. He discovered on the top of the ledge a deposit of ore about 12 ft wide and extending about 40 ft.

CUBA NO. 1 MINE SOLD.—From Mr. Jas. McGlinchy, of Calico, we learn that he and his partner Mr. J. N. Keyes, had recently sold one of their mines, the Cuba No. 1, to Lieut. Governor Daggett, receiving all they asked for it. This mine is situated near the Snow Bird in East Calico, and has been worked by Mr. McGlinchy & Keyes for over a year with fair profit and is still considered a valuable mine which can be operated by a company having their own mill and plenty of capital, with less expenses and give better returns than by parties with small means. Gov. Daggett has set four men to work assorting the ore on the dumps that was of too low a grade to be milled by the former owners without loss.

Trinity.

MORE RICH QUARTZ.—Trinity Journal, March 29: We learn that Meckel, Day & Enos have discovered a very rich quartz ledge on the East Fork, near Moor, Day & Co.'s location, but have no further particulars. That district is full of good quartz and we expect to chronicle many rich finds before the summer is over.

ALL BUSY.—Wm. Vollmers was in town from Trinity Center this week, and tells us that everybody in that neighborhood is at work and that prospects for both farmers and miners are excellent.

GOOD PROSPECTS.—Report says that good quartz has of late been found on Rush creek, near Jake Paulsen's place, and that the prospects are favorable for rich developments in that section.

Tuolumne.

SOULSBYVILLE.—Tuolumne Independent, March 26: The Virginia mine, about half a mile north of B. Soulsby mines, still continues to look well. The ledge is from 10 inches to one and a half ft, and contains some of the finest rock I have seen in the Co., and a great percentage of sulphurets and lead. Where it is not all sulphurets the gold can be seen in large quantities. This mine is situated west of Arasterville, and shows the best prospect of any mine in or adjoining Arasterville. The Buchanan mine has a ledge about 11 ft, more or less. A miner states the rock will pay \$20 per ton. Wm. Symons is taking the water out of the Louisiana mine. This mine is continually in a wrangle—working a while and shutting down, and many men who have worked there have lost their money. We hope Symons will keep it a-going good and not do as others have done. Mr. Hyde is preparing to start his mine and mill in full blast. The mill is a one-stamp battery, weighing 1,000 pounds. The ledge is several ft wide, assaying and prospecting well. The old Soulsby mine is again free from water, and they are sending up splendid

rock. It is said that Wm. Johns of Amador is coming to report the mine to the company at London, Boyle, Lander and Summers have a ledge near Summersville which averages two and a half or three ft, and prospects well. Another claim on the same lead, about 10 inches, which also looks very rich to the proprietors. And on Mt. Eaton, a mile from the above mine, these parties have still another claim, which is said to be good. The 10-ounce piece said to have been found on the premises must be taken with a little Worcestershire Sauce.

NEVADA.

Washoe District.

UTAH.—The northeast drift on the 1750 level was extended 378 ft, when wet and very soft ground was encountered, and work was discontinued. Until this ground has drained out, it is liable to slide or cave and it would be difficult to keep up. During the past week the principal work has been in the way of repairs to the 1950 station. A chamber is now being cut out for a fan, and next week they will be able to commence prospecting operations at this point.

SIERRA NEVADA.—The northeast drift on the 3100 level—now running north—is out about 275 ft. It shows about the same character of vein material as heretofore. The ground is quite dry. The fan at the 2900 is running and is sending air down into the north drift on the 3100 level.

HALE AND KOKROSS.—The southeast drift is making excellent progress. It is being pushed as rapidly as possible to the point where it will connect with the west drift from the Combination shaft. This connection will now soon be made, when active prospecting may be commenced at several points.

MEXICAN.—Good headway is being made in the winze just being started on the 3100 level, some 50 ft to the eastward of the main south and north drift.

UNION CON.—A diamond drill hole, joint with the Sierra Nevada, is being run west from the bottom of the winze at the 3100 level. The east crosscuts are being allowed to drain out, drill holes having been run in far enough to tap the wet streak of ground lying on that side.

CON. VIRGINIA.—The guides have been placed in the joint California winze from the 2700 to the 2900 level, and preparations are being made for drifting on the latter level to connect with the main north and south drift.

ALTA.—The ground in the face of the east drift on the 2150 level is working very well. The west drift is in favorable vein material, showing occasional streaks of quartz that carries some metal.

CALIFORNIA.—The guides have been placed in the joint Con. Virginia winze, and preparations are being made for drifting on the 2900 level.

OPHIR.—Are still extracting ore from the 150 and 250 levels. The exploring drifts and winze (below the 250 level) are making the usual progress.

BEST AND BELCHER.—Very fair progress is being made on the 2700 level, but it is still very hot, and must continue so until an air connection is made.

YELLOW JACKET.—Sufficient ore is being taken out to keep the mills on the Carson river running to their full capacity.

ANDES.—About the usual quantity of low grade ore is being found. The prospecting drifts are promising well.

CROWN POINT.—The usual amount of ore is being extracted, and all the mills are running regularly.

IMPERIAL.—Some ore that will pay for working is being found in the explorations on the old upper levels.

BELCHER.—The usual quantity of ore is being extracted and sent to the mills on the river for reduction.

American District.

SILVER.—Silver State, April 1: L. F. Dunn is developing a silver mine discovered by him in American district, south of the Eagle mine, in Spring valley. The ore is high grade, and he intends to have several tons of it worked as soon as the roads get good.

Bullion District.

CAPITAL WANTED.—Battle Mountain Messenger, March 24: Bullion is one of the mining camps in this state that stands on its merits. The majority of the mines have paid from the beginning. There has never been any great amount of capital expended in the development of the mines, and most of the nine owners being poor men, who have been compelled to make their prospects pay from the beginning or abandon them. With a little capital Bullion would become one of the finest mining camps in Nevada, and were it in Idaho or Arizona, it would be talked of by the press as a great discovery. We have no doubt that Bullion has more real merit to-day than the Coeur d'Alene and many other mining camps a distance off which are being sought after by so many people.

MINING NOTES.—Foothill Tidings, March 29: Good ore is coming out of the upper tunnel of the North Banner. The New York Hill company are still drifting in the No. 11 level. There is no change in the appearances of the mine since our last report. The Peabody resumed work several days ago, under the direction of Richard Moore. On Friday the water was all out of the mine, and drifting on the ledge commenced. The Pittsburg mine, owned by Samuel Granger & Co., is still being worked. The tunnel is now within about 120 feet of the shaft, and it is thought that the tunnel will be completed in about two months. When the tunnel is finished, steam will be started and rock crushed. The Idaho is still looking well, and still keeps up its regular lick of paying a dividend every month. Monday next is the regular pay day of the Idaho company, and instead of giving the men their coin at the mine, as has been the custom, they will be paid at the railroad office, over Coleman & Glasson's store. There is no change in appearances at the Empire. The mine is looking as well as ever. The company are working six levels, and from all of them pay-ore is extracted. The shaft is still being sunk, and is now down nearly 1,500 feet. There is a 3-foot ledge of good ore in the bottom of the shaft. Yesterday the Rocky Bar mill completed a crushing of 36 loads of rock from the Magenta mine, and from the batteries got 205½ ounces of amalgam, which, it is estimated, will be worth \$6 per ounce. At our going to press,

the amalgam is being retorted. This is a time showing for the Magenta, but is nothing more than was expected, as the rock has been looking well all the time. The Wintfield Scott mine, owned by Michael Roach, and situated near Alton Ranch, is showing a good ledge. The company now have about 100 tons of ore on the dump, which will be crushed as soon as some of the custom mills can get time to run it through. It is estimated that the rock taken from the ledge will yield \$35 per load. The last crushing from this ledge paid \$28 per load. The shaft at the Imperial is now down 200 feet, and the company began drifting east and west, on Thursday night. The pumps handle the water very easily in this mine only four pounds per day being required to pump the water out. Seven men are now at work on the Imperial, and are making good progress. About the end of next week the ledge will be cut, the general quality of which is good.

Belmont District.

BELMONT.—*Courier*, March 29: Work on 200 level south is progressing well. Total length of drift to date, 379 ft; shows a well-defined ledge 2 ft wide of extra good quality of milling ore. No. 3 slope is 22 ft above 200-foot level, and will connect with air chute from slope No. 2 in two days. In slope No. 2 are stripping ledge, and will commence taking out ore this week.

Columbus District.

COLUMBUS CO.—*True Fissure*, March 29: Since the date of the last report the usual amount of work has been done on the different levels in the mine. The crosscut from the fourth level station has been extended 15 ft, making a total length of 50 ft, and the broken up vein matter still continues in the face. In the west drift from the south crosscut on the 150 level work has been discontinued, and work in the east drift from the same point was resumed; a quantity of 560 ore is being extracted from this drift. No work of note has been done on the first level lately.

MOUNT DIABLO.—During the past week winze No. 5 has been sunk nine ft, its total depth being 113 ft. It shows a little ore in the bottom. In the intermediate, between the second and third levels, 20 ft of south crosscut have been driven without finding anything of value. The south crosscut, from the east drift on the second level, is in 88 ft and shows small spots of good ore that looks encouraging. The west drift on the second level has been advanced 14 ft and shows low grade ore. In the intermediate, between the first and second levels, there is some six to eight inches of ore in an east drift.

Central District.

LOOKING WELL.—In Central district, west of Mill City, the Locomotive and Railroad mines are looking well, and are sufficiently developed to supply a ten stamp mill with paying ore steadily.

Eureka District.

THE BOWMAN.—*Sentinel*, March 26: The syndicate of Boston capitalists, who own the Bowman and several other mines in Eureka district, sent out one of their own number, Colonel Wiley, to look into the condition of their property. This gentleman, though candidly stating that he knows nothing of mines or mining, is a business man of experience. He spent about a week looking after the interests of his company here, and went away yesterday morning satisfied with the outlook to such an extent that he will advise the expenditure of \$100,000, if necessary, for the prospecting and development of the mines referred to. This is gratifying, and, we believe, from the knowledge we have of the properties, that no money will be lost in economically working them.

Sacramento District.

HUMBOLDT QUEEN.—The Humboldt Queen mine in Sacramento district is being worked right along, and several carloads of ore, of which there is said to be hundreds of tons on the dump, is being shipped to Denver for reduction.

Star District.

ORE.—At Star, Woolcock and Phillips are working the Grizzly mine, and taking out considerable ore that averages over \$7,000 to the ton.

Willow Creek District.

ATTRACTING ATTENTION.—The Willow Creek mines are attracting considerable attention, and Eureka men who are now personally examining some of the leads, will probably commence developing some of them in a few weeks. The mines are extensive and are situated on the other side of the mountain from the Paradise mines. A number of very promising locations have been made in the district, and the Ohio, the only mine that has been worked to any extent, has yielded its owners thousands of dollars from ores shipped to Salt Lake.

ARIZONA.

QUHOTOA.—*Prospector*, March 22: The mines on Ben Nevis mountain are quietly being opened up. The bluster that usually characterizes the development of mining properties in other districts is notable for its absence. The three shifts that have been working since developments commenced, have, in a steady manner, progressed the work in the tunnels and winze. The rock through which they have been working has from the offset been exceedingly hard. Mr. Smith daily visits all the tunnels, notes the development, and proffers advice when necessary. It is that gentleman's conviction that the properties are without peer on the Pacific slope.

PEERLESS.—The Peerless tunnel No. 1, east side, is in 90 ft. The country formation is much softer, and is heavily stained with iron. Work is being pushed very rapidly under the circumstance of soft rock. Tunnel No. 2, west side, now penetrates the mountain 82 ft. Streaks of quartz are becoming more frequent, and rapid headway is being made through softer ground.

PEER.—Tunnel No. 3, on the west side of the mountain, has attained a depth of 75 ft. The same peculiarities that characterized the country formation last week, are still noticeable.

CROCKER.—Tunnel No. 4, east side, is in 64 ft. There is no material change in ground.

HORSE MOUTH.—The Horse Mouth cut in the Peer mine, measured on the 14th inst., 14 ft. Good grade ore is being taken out.

WINZE.—Work on the winze is progressing rapidly through, it is said, high grade ore. The depth is at present writing not known.

SHEEP NEST MINE.—It is rumored that a large

body of high grade ore has lately been struck in the tunnel of this mine. The report is undoubtedly true, as ore was taken out from the face of the cliff where initiatory work was commenced on the tunnel that gave excellent assays. It is an established fact that ore exists in Ben Nevis mountain at a depth of 450 ft, this being the difference in height between the tunnel in the Sheep Nest and the apex of the Crocker.

MOHAVE.—*Miner*, March 29: Mohave county is not half prospected yet, and new strikes are being made every day or two. Five tons of ore valued at \$2,000, were shipped from the new mines in Grooms Peak district on March 22d. Tom Burke has discovered some very rich copper claims in Gold Basin, and has some specimens of the ore on exhibition in the Recorder's office. The miners working in the neighborhood of Grooms Peak in the old Aubrey district, have organized a new district under the name of Grooms Peak district. Jack Johnson has recently shipped two lots of ore from the (C. O. D.) mine near Stockton hill, to the sampling works at Kingman. One lot worked 222 ozs. in silver to the ton, and the other 190 ozs. The new shaft on the dividing line between the Schuykill and Elkhart mines at Chloride, is down about 45 ft in good ore. There are eleven men working on this mine. Messrs. Davis and Potts have shipped thirty tons of ore from the Elkhart mine to the Benson smelter. They have about sixty tons of ore now on the dump, all of which is the product of twenty-five days work. They have five men now at work on this mine.

COLORADO.

NOTES.—*Georgetown Courier*, March 27: Fifty tons of ore were shipped from the Kitty (Lyde mine last week. Some of this ore returns over 600 ounces per ton. Duncan & Foster have opened up a good body of ore in the Wolverine lode, Democrat mt., which mills 200 ounces silver per ton. A number of car-loads of machinery for the Golden Leaf mill, on Soda creek, arrived last Friday. It is being placed in position. Joe Niebauer, on the No. 5 lode of the Pay Rock mine, is sinking from the lode, and has a streak of mineral about two inches wide, which runs 230 ounces silver. A fine body of mineral has been uncovered by the lessees in the 52-foot shaft on the No. 2 Joe Reynolds, on Silver creek. The ore mills 255 ounces silver per ton. Spieles & Co., lessees on the Choctaw, had a mill-run last Saturday, the first-class of which returned 150 ounces silver per ton and 65 per cent lead; second-class 71 ounces silver and 33 per cent lead. A strike in the east workings of the 13th level of the Terrible recently opened up an ore body of nearly 18 inches in width. The Silver Ore shaft will be sunk and a level run from which stopping will be done. The shaft which has been sunk on the Norway lode, has paid expenses of sinking from the grass-roots. Stopping is expected to open up large bodies of ore. The ore runs from 525 to 1,000 ounces silver per ton. Bates & Co., lessees on the Bismarck, have finished opening up their ground and commenced stopping. They have sunk 40 ft of winze and run a 30-foot drift, and have commenced stopping at the end of the drift. In sinking the winze much of the ground yielded \$63 per foot, and it is reasonable to suppose that they have some excellent stopping ground.

THE JOE REYNOLDS.—There is not a property in this county that has made more rapid strides of progress in richness and yield in the past year than the Joe Reynolds. It is now one of the most valuable and productive mines of its locality. Nearly every lessee on it is in good pay. Moore & Co. had a mill-run, this week, which returned over \$7,900 for three weeks' work of four men. In sinking their shaft, it has paid, in this time, \$120 per foot. It is now down the full depth—60 ft. Digney & Co. have their shaft down 20 ft, and 10 inches of ore and quartz is shown, which looks favorably.

IDAHO.

MINING SALE.—*Wood River Times*, March 26: News comes from London, England, that an organization known as the Bullion Mining Co. has been formed there, with a capital of \$7,000,000, divided into shares of \$5 each, to purchase the Bullion-Ophir group of mines, at Bullion, near Hailey. The experts who have examined the property on behalf of the purchasers have variously estimated the ore in sight to be worth from \$50,000 to \$2,000,000 net—that is, clear of all expenses. The experts visited the mines last year. Since that time they have been steadily developed, and now show a much larger quantity of ore than ever before. On two or three occasions, heretofore, this exceedingly valuable property has been reported sold to an English syndicate, but the sale always failed to take place. Now, however, there seems to be no doubt that it will change hands—and very soon, too. This sale will mark a new epoch in the history of Wood river. During the past two years the Muldoon sold for \$100,000; the Narrow Gauges for \$80,000; the Silver King for \$125,000; the Mayflower for \$375,000; the Minnie Moore for \$500,000, etc. But all these were only prospects, and brought prospect prices. Now, however, we have a property that is going to sell for over \$7,000,000. Whenever \$7,000,000 is paid for a mining property, in any district, that district has become a permanent one, and its properties cease to be "prospects," and become ranked as "mines." That is how this sale will mark a new epoch on Wood river. In future, our mines will be worked for permanent returns, and not for the sake of a few tons of ore with the proceeds of which the producer may be enabled to spend the summer in Salt Lake or elsewhere.

THE LION MINE.—*Ketchum Keystone*, March 24: Authentic news comes from Vienna that the main tunnel of the Lion mine now in 100 ft is working in ledge matter and supposed to be within 20 ft of the ore vein. Hollow and mysterious sounds come from the head of the works which cannot be accounted for unless caused by the proximity of some portion of the Vienna mine adjoining. This, however, is only probable. The Vienna and Lion mines have long been supposed to be upon one and the same ore vein, in fact it became so evident last fall that the Vienna and Lion companies beheld the necessity of establishing boundary working lines, which they did through compromise.

THE BLACK HORSE MINE.—The Black Horse mine situated on Boyle Mountain about fifteen miles west of Ketchum and operated by a Boston company with Wm. Floyd, superintendent, has been doing fine work all winter, and has developed magnificent ore bodies. About 500 tons of first-class lead ore are

now on dump, filling a large log ore-house, and under the present rate of progress it is estimated that 1,000 tons or more will be ready for the smelters by May 1st. The ore vein is from six inches, the narrowest place, to six feet, the widest place, in width, and the stopping ground now developed is extensive. The Black Horse is thus destined to figure prominently as a new contributor to our home smelting industry, and will assist very much the increased value of our bullion export for 1884.

COEUR D'ALENE.—*Nugget*, March 26: It is impossible at the present time to give much authentic information relative to richness of the placer diggings. The "Widow" has unquestionably yielded from \$2 to \$20 per day to the man. The aggregate amount of dust taken from the claim exceeds \$18,000. The Peter's claim only run about three weeks, and cleaned up from \$10,000 to \$12,000, according to the statement of Dr. Campbell, who was in a position to know the facts. W. E. Cole saw one lot of dust weighing \$300, which the parties asserted had been washed out by three men in three days, the work having been performed in six inches of water. Eleven claims have lines of sluices and are said to be down to bedrock. These are the Widow, Ives, Hapenstall, Wyant, Macomber, Campbell, Points & Co., McQueen, Moscow, Geo. Murray, Rockford Co., and Allman & Co. On all these claims, and many others, work is now progressing. Drainage ditches are being cut, and sluices are being placed in position. The "Widow" claim is now in shape for mining, and pay dirt is being washed. On Bear gulch and all the numerous tributaries of Pritchard creek, the miners are busy at work. A few weeks will solve the problem fully, and gold dust will either be plentiful in the various camps or else the mines will be voted a failure so far as placer diggings are concerned. No fears are entertained regarding the result by those whose money is invested. On the older claims it is boldly asserted that the question has been fully decided, and the answer is, "there's millions in it."

MONTANA.

THE PARROT.—*Inter-Mountain*, March 21: The smelting capacity of the Butte reduction works is being constantly increased. The Colorado smelter, which two years ago was running but two stacks now has six in operation; the Montana smelter, which three years ago was treating about 25 tons of ore daily, now has facilities for treating 125 tons a day. It has five matting furnaces and one blast furnace. The erection of still more is in contemplation. The Parrot company has kept fully abreast with the others. Its co-concentrating facilities are now perfect and the number of furnaces has been so increased that 80 tons of ore per day are now being reduced. It averages 20 per cent. copper. The company mine was never before in such good shape to insure a constant and heavy production. The ore output now is 110 tons per day, two-thirds of which is put through the concentrators. Mr. Franklyn Farrell, who is one of the heaviest stockholders in the concern and who with Mr. A. F. Migeon, the former superintendent, who is now in this city, told a reporter to-day that an additional matting furnace will soon be erected, which will increase the daily smelting capacity to fully 100 tons. The Parrot company is one of the solid institutions of the camp and there can be nothing more gratifying than the confidence of its managers in the future of the property as evidenced by past expenditures and future intentions.

THE CABLE MINE.—*Inter-Mountain*, March 26: From Superintendent J. C. Savery, of the Cable mine, it is learned to-day that during the past few months it has been thoroughly timbered and is now in splendid shape for continuous operation. On the 300-foot level drifts are being extended which have opened up vast ore supplies, the extraction of which, on a large scale, will soon begin. The mill will be fired up in about two months, and will thereafter run uninterruptedly. The company is now working about twenty men. The Pyrenees mine and mill are running as usual, and at a profit. It is believed, however, that the sale of the property has fallen through, owing to the misrepresentation made to the owner of the mine by a certain party who claimed to control unlimited capital. However, there is more money in working the Pyrenees mine than in selling it, and the failure of recent negotiations is regarded by those who understand the merits of the mine as an extremely fortunate thing for Mr. Cameron.

BULLION.—*Helena Herald*, March 20: Two large bars were received this morning for shipment by the Merchant's National Bank of Helena, of the value of \$12,000. The bars contain about \$5,000 gold and \$7,000 silver, and were refined from ore taken from the lead at the end of the Maskeleyne tunnel in the Drum Lummon mine.

NEW MEXICO.

ORGANS MINES.—*Cor. Rio Grande Republican*, March 29: Jenkins and Robinson are taking out good ore from the Little Buck, which they are sacking for shipment. It will average say \$400 or \$500 per ton. Clark and Brown's El Dorado is down 40 or 50 ft in galena and sulphurets. It shows up good ore, but the ledge is somewhat broken. The vein is three ft wide, and they are now getting down to a more solid foundation. H. Willman's claim is down 10 or 15 ft, and the vein is about three ft wide. The mineral is the same as in other claims in that district, viz: chlorides and sulphurets. It is a contrast between slate and granite, and is an A. No. 1 prospect. The Foy brothers are working on a claim owned by them near the Galloway, the name of which we did not learn. They have a lead about two ft wide, and the ore assays \$900 to \$200 a ton, and is the same chloride and sulphurets ore that is found in all the claims in that district. The pump of the Memphis is ready for operation, but is at a dead stand-still. The old boiler that is to run it, and the new patch to put on it, are lying there side by side, but there is no one there to combine the two. Col. J. S. Crawford has returned to the Galloway, where he proposes to sink down to 100 ft at once. He is enthusiastic over the brilliant future in store for the Organs, and proposes to establish a new townsite right by his mine, and, as soon as sufficient development is done, to establish reduction works there. He has already, we are told, ordered a mile and a quarter of iron pipe to bring water to the mine from a spring that distance away. At the new working of the Memphis claim, a short distance up the hill from the late rich strike, at a depth of perhaps 30 ft, they have discovered a large

cave or chamber, the walls of which are coated with a thin scale of native copper. We did not learn the dimensions of the cave, but on one side of it is a sort of natural shaft descending to an unknown depth.

KINGSTON.—*Cor. Los Vegas Gazette*, March 22: The camp will now soon be able to decide beyond question the fact as to whether its mines will produce ore at great depth or not. Enough has been said about the wonderful "float" that is found so abundantly in this section, and now it remains to be shown that this float is only an indication of the vast wealth that lies under the surface. Deep mines are required to make a good, substantial, lasting mining camp. There are now four steam hoisting works in active operation, and as they are all being worked as fast as they can, they will soon settle this (to outsiders) mixed question; and the sooner the better, for all here have full confidence in the successful issue of these experiments, and any way the truth had better be known one way or the other as soon as possible, for if the ore is going to last we want to know it, and if it is not, it is equally essential that the truth be learned, for the good of all parties in the camp, and even in the territory. Encouraging returns are still coming in from all quarters. We hear daily of men who are quietly working their prospects, sending for ore sacks, and sacking their ore in anticipation of the completion of "our smelter." And this brings me to the most important enterprise that is being undertaken in the camp, viz: the smelter. The most of the smelters now lying idle have been put up in a heedless, wild sort of way, during a boom, without giving the matter the care and investigation such an investment requires. They are put up without first learning if there is enough available ore to run them. Then, again, they are put up by inexperienced people, and in fact there is always some excellent reason why the works should prove a failure. Then, again, money is raised to put up a smelter, but not a thought is given to the money required to run it successfully at the start. Much capital is required to buy ore, etc., to make the thing a success. The parties who propose to operate it should have about as much cash on hand when it is completed as it took to put it up. Now, our smelter is being put up by eastern parties of unlimited capital, under the direct supervision of men who have had protracted experience in the business. Careful estimates have been made of the cost of everything required. The ores to be worked have been assayed thoroughly, not only as to their worth in silver, but also as to their fluxing propensities, and the Iron King mine, which belongs to the Kingston smelting company has to-day enough lead and silver ores in its "dumps" to run this smelter successfully for a year; so that even if they did not get a pound of ore from outside mines they could get a sufficient quantity of fluxing and high-grade silver ores from their own mine. The capacity of the smelter being sixty tons a day, a person can form some idea of what kind of a mine the Iron King is; and knowing all this, it seems incomprehensible that there are prospects right in the vicinity of the Iron King, with "croppings" and indications for surpassing those that existed in the Iron King, without a stroke of work being done on them for want of capital; but this state of affairs cannot last. Once the smelter begins to work and roll out bullion, capitalists will get a better idea of the character of the mines of this section.

OREGON.

GENERAL NOTES.—*Jacksonville Times*, March 28: Simmons, Ennis & Co.'s big enterprise near Waldo is progressing. Jack Layton of Farris' gulch is making the gravel fly and will have a good run. Through the aid of reservoirs a number of miners are doing considerable work. Skeeters & Walker of Hogue hill, Josephine county, are busily at work, with favorable prospects. The miners of Foothills creek, Jos. Goldworthy informs us, are in most cases favored with a fair supply of water. The mining season will not be a long one, but most of the miners will do much better than during the past two. W. J. Stanley is reported to have struck a quartz ledge in Grant's Pass precinct, the ore from which prospects well. S. W. Forbes of Josephine county, who is mining in the Althouse district, recently picked up a 17-ounce slug of gold. It seems as if there is more snow in the mountains than usual, which will keep up the water supply for those miners whose ditches head there. The cool weather and occasional showers are keeping the water up, though not increasing it to any extent. Plenty of rain is what the miners are hoping for. Mr. Corker of Pleasant creek reports plenty of water in that region, and some of the miners are doing well. Considerable coarse gold has been picked up there of late. N. DeLamatter has both his claims near Kerbyville in operation, and having excellent ground and plenty of water, will no doubt make a big clean-up this season. A Waldo correspondent writes us that Wimer & Sons are running both of their pipes day and night. Deselles & Co.'s mine at Butcher Gulch is also being operated the same length of time.

UTAH.

REVIEW.—*Salt Lake Tribune*, March 25: The week has been a fair one in the ore and metal trade. The late snows have made it worse than ever in the hills and canyons but it is getting about time for the season to begin to open, and the beginning of operations is apparent. For the week ending March 26th, inclusive, receipts of bullion in Salt Lake amounted to \$118,394.77; of ore, \$5,360; of both, \$123,754.77. The week before the total receipts were \$101,812.52, of which \$87,922.52, was bullion. The shipments from Salt Lake City for the week ending March 22nd, inclusive, were as follows: forty cars 950,721 pounds. The Horn Silver Company shipped for the week eleven cars of ore, valued at \$33,000, bringing the total shipments to date for this year up to \$486,000. The Ontario shipped during the week 32 bars of bullion, of the value of \$32,255.12, making the total shipments of this company since January 1st, inclusive, \$386,743.75. The usual dividend of fifty cents a share is declared, payable on the 31st, aggregating \$75,000. Total of dividends this year, including the third \$225,000. The Crescent company made two shipments of ore, aggregating \$5,360 in value. There is nothing specially new from this company. The Stormont sent up two bars of silver, assaying \$3,000. The product of the Hanauer smelter for the week amounts to eight cars, \$16,540.

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Ingersoll, D2 3", large ports.....	1.785 ft. per hour.
Ingersoll, E, 3 1/2", medium ports.....	1.601 "
National, Improved, 3 1/2".....	1.280 "
Rand, Improved, 3 1/2".....	1.041 "
Ingersoll, D2 3", beat Rand 3 1/2".....	.744 "
Ingersoll, D2 3", beat National 3 1/2".....	.565 "
Ingersoll, E 3 1/2", beat Rand 3 1/2".....	.560 "
Ingersoll, E 3 1/2", beat National 3 1/2".....	.321 "
National beat Rand.....	.139 "

[ESTABLISHED 1864.]

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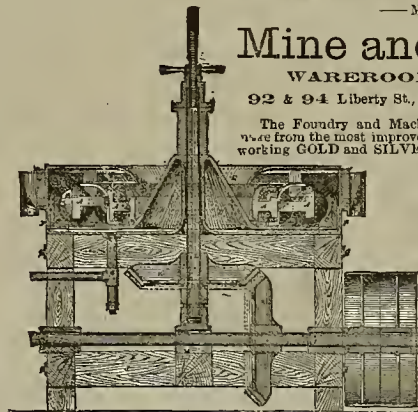
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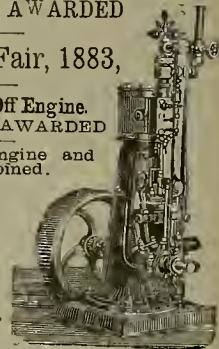
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All kinds of Quartz Screens,
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and brass for flour and other
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This is the only Scientifically Constructed Bucket in
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interior corners to clog up. It runs with great ease, and
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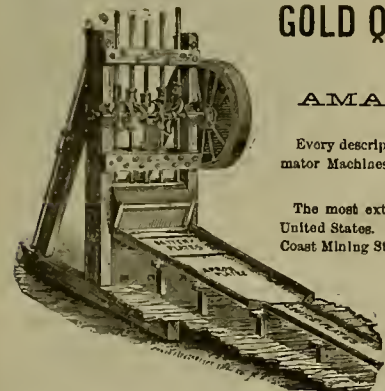
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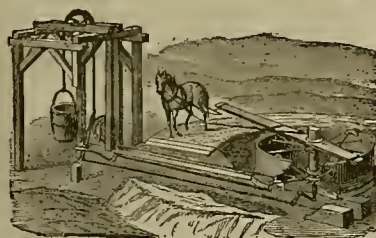
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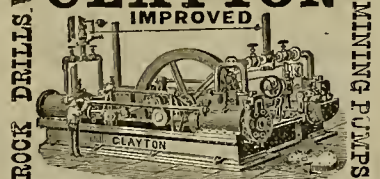
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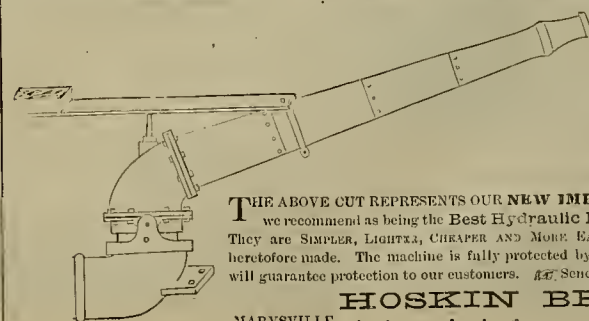
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List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

FOR WEEK ENDING MARCH 25, 1884.

295,854.—BOILER SCRAPER—Jos. H. Beare, Tombstone, A. T.
295,619.—OVERALLS—W. A. Dawson, Stony Point, Cal.
295,622.—VALVE GEAR FOR HYDRAULIC PUMPS—Geo. W. Dickie, S. F.
295,646.—ORE FURNACE—Geo. W. Jones, Silver Creek, Cal.
295,649.—SAW TOOTH—R. W. Kellen, Albion, Cal.
295,882.—CLEANING COMPOSITION—F. S. Monroe, Oakland, Cal.
295,668.—GRAIN SEPARATOR—P. L. Nash, Hollister, Cal.
295,672.—BALING PRESS—John D. Page, Sanders, Cal.
295,673.—FOLDING TABLE—W. W. Quigley, Santa Ana, Cal.
295,674.—GATE—E. D. Rathbun, Williams, Cal.
295,815.—EXTRACTING METALS—E. H. Russell, Park City, U. T.
295,816.—EXTRACTING METALS—E. H. Russell, Park City, U. T.
295,836.—PURIFYING HYPOSULPHITE SOLUTIONS USED IN LEACHING ORES—E. H. Russell, Park City, U. T.
295,887.—SEPARATING METALS FROM ORES, ETC.—E. H. Russell, Park City, U. T.
295,704.—ROTARY PUMP—J. M. Wiles, Butte City, Cal.
295,710.—SIDEWALK CURB AND SURFACE CASE FOR ELECTRIC WIRES—Richard Wylie, Napa, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

MACHINE FOR THRASHING AND SEPARATING GRAIN, PEAS, ETC.—Alfred Swingle, S. F. No. 295,305. Dated March 18, 1884. This machine for shelling peas, beans, etc., separating coffee, rice or oats from the exterior, consists in a combination of devices. The peas or other article being fed from the hopper into the concave, the cylinder rotates with the elastic diamond-shaped projections upon its surface in close proximity to the similar points on the concave. This latter is caused to reciprocate transversely to the line of rotation of the cylinder, and the effect on the pea-pods is to roll and burst them, so the peas will fall through holes on to an inclined belt and are discharged. The peculiarly actuated, elastic, rubbing-surfaces are very effective in denuding rice or oats of their husks, the elastic points being made smaller and both surfaces being imperforated, so that the grain and husk are discharged together and afterwards separated by a fan or other winnowing machine.

STEAM BOILER.—Joseph Stevens, S. F. No. 294,927. Dated March 11, 1884. The improvement in steam boilers covered by this patent consists of a lower portion composed of alternate series of horizontal tubes crossing each other at right angles, their ends opening into vertical water-legs, which form the sides and inclose the grate and fire space, a combined steam and water drum situated above the tubes and circulating pipes, connecting this drum with the vertical water-legs at top and bottom.

APPARATUS FOR CURING TEA AND COATING COFFEE.—August Schilling, S. F. No. 295,290. Dated March 18, 1884. This invention is an apparatus for curing tea, glazing coffee and performing other functions of a similar nature, and it consists of a revolving cylinder, into which the substance to be treated is introduced, said cylinder being surrounded by a steam jacket, or other device for imparting the heat of steam to it.

New Incorporations.

The following company has been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

TUK SAN FRANCISCO AND WHITE RIVER M. CO., March 24th. Capital stock, \$1,000,000, in 100,000 shares. Directors, G. W. Brown, S. D. Simmons, W. A. Sublett, Martin White, and Martin Burdell.

SURPRISE CANYON M. AND M. CO., March 28. Certificate filed in Clerk's office of Inyo county. Capital stock \$1,000,000. Location, Panamint, Inyo county. Directors, C. H. Stanfield, A. Benham, S. B. Morey, J. H. Maloney and H. T. Holbrook.

UNION WATER M. AND M. CO., March 28. Object: Conducting and carrying on a general mining, milling, lumber and water business, to acquire, lease, operate and sell saw mills; to manufacture and sell all kinds of lumber; to sell water for domestic and agricultural purposes in and for the town of Murphy's Camp, Douglas Flat, Vallejo, Carson Hill, Angel's Camp and Altaville, in Calaveras county. Directors, J. W. Coleman, W. S. Wood, George L. Bradley, C. Rosner, G. D. Morse, Moses Hopkins, W. A. Keefer. Capital stock, \$15,000,000, in 150,000 shares.

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Should this paper be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S. M. Co.	Nevada.	29.	50. Mar 27. May 2.	W. H. Watson.	302 Montgomery st.
Alpha Hydraulic M. Co.	California.	5.	25. Jan 23. Mar 25.	P. M. Scott.	326 Montgomery st.
Belle Isle M. Co.	Nevada.	7.	20. Mar 12. Apr 17.	S. J. W. Pew.	310 Pine st.
Belmont M. Co.	Nevada.	36.	75. Feb 20. Mar 31.	J. W. Pew.	310 Pine st.
Benton Con. M. Co.	Nevada.	12.	20. Feb 5. Mar 11.	W. H. Watson.	302 Montgomery st.
California M. Co.	Nevada.	11.	20. Mar 14. Apr 21.	C. P. Gordon.	309 Montgomery st.
Champion M. Co.	California.	14.	07. Mar 7. Apr 10.	Theo. Wetzel.	522 Montgomery st.
Con Virginia M. Co.	Nevada.	20.	20. Mar 12. Apr 16.	A. W. Haynes.	309 Montgomery st.
Guerra Santa M. Co.	Mexico.	1.	5. Mar 4. Apr 8.	O. M. McLean.	324 Pine st.
Daisy Cement M. Co.	California.	1.	2. Mar 27. May 1.	C. J. Collins.	512 Montgomery st.
Diana G. M. Co.	Nevada.	5.	10. Mar 5. Apr 9.	P. J. Flanagan.	348 Pine st.
Excelsior Water Co.	California.	6.	50. Jan 29. Apr 15.	H. B. Wheaton.	215 Sansome st.
El Dorado M. Co.	Nevada.	2.	05. Mar 6. Apr 9.	J. H. Sayre.	326 Pine st.
Elko Con. M. Co.	Nevada.	3.	15. Mar 4. Apr 8.	J. F. Spiering.	309 Montgomery st.
Gould and Curry M. Co.	Nevada.	47.	50. Mar 7. Apr 11.	S. A. K. Durbin.	309 Montgomery st.
Grand Prize M. Co.	Nevada.	15.	25. Feb 23. Apr 3.	E. M. Hale.	327 Pine st.
Gorilla M. Co.	Cal.	3.	15. Feb 27. Mar 31.	A. A. Enquist.	436 Montgomery st.
Independence M. Co.	Cal.	13.	30. Mar 12. Apr 16.	H. G. Jones.	310 Pine st.
Indian Spring Drift M. Co.	California.	1.	10. Mar 13. Apr 19.	A. B. Paine.	359 Montgomery st.
Justice M. Co.	Nevada.	40.	10. Mar 3. Apr 7.	R. E. Kelly.	419 California st.
La Grange Ditch and M. Co.	California.	4.	50. Mar 31. May 5.	A. Halsey.	328 Montgomery st.
Lake County Quartz M. Co.	California.	8.	12. Mar 10. Apr 16.	A. Baird.	430 California st.
Marlower Gravel M. Co.	Cal.	23.	15. Mar 5. Apr 9.	H. G. Jones.	327 Pine st.
Musche M. Co.	California.	3.	15. Mar 31. May 9.	Letts Oliver.	325 Montgomery st.
Morgan M. Co.	California.	10.	60. Feb 27. Apr 7.	C. L. Tilden.	806 Market st.
Mammoth Bar M. Co.	California.	5.	15. Mar 14. Apr 18.	J. W. Pew.	310 Pine st.
Milton M. Co.	California.	1.	1.00. Feb 14. Mar 24.	H. H. Pfeiffer.	320 Sansome st.
Northdown Gravel M. Co.	California.	5.	15. Mar 5. Apr 9.	J. J. Mason.	331 Montgomery st.
North Gould & Curry M. Co.	Nevada.	8.	25. Feb 23. Apr 3.	C. H. Mason.	331 Montgomery st.
New Coseo M. Co.	California.	17.	40. Jan 15. Feb 23.	E. B. Clement.	710 Washington st.
Puget Sound Iron Co.	Washington.	7.	1.00. Jan 12. Apr 25.	A. Halsey.	328 Montgomery st.
Pedro Coro M. Co.	Arizona.	1.	6. Feb 23. Apr 7.	J. Stadolph.	419 California st.
Pleasant Valley M. Co.	Cal.	3.	10. Mar 3. Apr 7.	J. E. B. Holmes.	309 Montgomery st.
Savage M. Co.	Nevada.	53.	50. Feb 5. Mar 10.	J. E. B. Holmes.	309 Montgomery st.
Union Con. M. Co.	Nevada.	26.	1.00. Mar 6. Apr 8.	J. M. Buffington.	309 California st.
Utah S. M. Co.	Nevada.	43.	1.00. Mar 21. Apr 28.	W. G. Pratt.	309 Montgomery st.
Wildman M. Co.	California.	1.	25. Feb 13. Mar 28.	R. E. Eilon.	310 Pine st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Champion M. Co.	California.	Theo. Wetzel.	422 Montgomery st.	Annual.	Apr 8
Bulwer Con. M. Co.	California.	W. Willis.	309 Montgomery st.	Annual.	Apr 9
Columbus Con. M. Co.	Nevada.	J. M. Buffington.	309 California st.	Annual.	Apr 17

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Bonanza King M. Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Apr 15
Bodie Con. M. Co.	California.	G. Sessions.	309 Montgomery st.	50.	Apr 5
Bulwer Con. M. Co.	California.	W. Willis.	309 Montgomery st.	10.	Jan 23
Contention Con. M. Co.	Arizona.	D. C. Bates.	309 Montgomery st.	25.	Jan 12
Derbec Blue Gravel M. Co.	California.	T. Wetzel.	522 Montgomery st.	10.	Mar 15
Idaho M. Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Apr 2
Jackson M. Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar 16
Kentuck M. Co.	California.	J. W. Willis.	309 Montgomery st.	10.	Mar 19
Paradise Valley M. Co.	Nevada.	W. Letts Oliver.	328 Montgomery st.	10.	Mar 20
Standard Con. M. Co.	California.	Wm. Willis.	309 Montgomery st.	25.	Mar 12
Silver King M. Co.	Arizona.	J. Nash.	315 California st.	25.	Dec 15
Syndicate M. Co.	California.	J. Stadolph.	419 California st.	10.	Apr 5

Mining Share Market.

Inactivity still reigns in the stock market. What fluctuations have occurred have been very slight indeed. On the Comstock they have shown up nothing of importance although they continue to work away hopefully. All is now going on well in the middle mines, and active prospecting will be resumed in all as soon as connection is made between the west drift from the Combination shaft and the south drift from the Hale and Norcross on the 2800 level. All is going on well at the Gold Hill mines, and as there is a promise of an abundance of water in the Carson river, the indications are that these mines will do a profitable summer's work. The Ophir is yielding the usual amount of low grade ore from the 150 to 250 levels, while a good deal of prospecting is being done at greater depth. The Gould and Curry and Best and Belcher folks are steadily progressing, and as soon as they secure a good circulation of air will be in a position to do a large amount of prospecting. At the north end of the Utah folks are preparing to do some prospecting on the 1950 level, where there is still much unexplored ground.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Bullion Shipments.

Hanauer, March 26, \$2,050; Horn Silver, 26, \$6,000; Ontario, 26, \$3,850; Horn Silver, 28, \$6,000; Hanauer, 28, \$2,100; Crescent, 28, \$2,590; Horn Silver, 29, \$6,000; Ontario, 29, \$10,622; Vienna, 29, \$5,820; Ontario, April 1, \$10,989; Hanauer, 1, \$6,200; Crescent, 1, \$3,600.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BENTLEY—Sacramento county.
A. S. DANIELS—San Mateo county.
C. A. KNOX—Yolo and Napa counties.
Wm. R. McQuiddy—Tulare county.
T. H. MERRY—San Bernardino, Ventura and Santa Barbara counties.
C. D. McDUFFIE—Sacramento county.
JOHN H. STURCK—Santa Clara county.
W. B. CROWELL—Merced and Stanislaus counties.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAR. 13.	WEEK ENDING MAR. 20.	WEEK ENDING MAR. 27.	WEEK ENDING APR. 3.
Alma.	1.50	1.30	1.50	1.30
Alta.	1.50	1.30	1.50	1.30
Andes.	1.50	1.30	1.50	1.30
Argenta.	1.50	1.30	1.50	1.30
Belcher.	1.50	1.30	1.50	1.30
Belmont.	1.50	1.30	1.50	1.30
Best & Belcher.	1.50	1.30	1.50	1.30
Bodie.	1.50	1.30	1.50	1.30
Bodie King.	1.50	1.30	1.50	1.30
Bodie Isle.	1.50	1.30	1.50	1.30
Bodie Con.	1.50	1.30	1.50	1.30
Bodie Trunk.	1.50	1.30	1.50	1.30
Bulwer.	1.50	1.30	1.50	1.30
California.	1.50	1.30	1.50	1.30
Challenger.	1.50	1.30	1.50	1.30
Champion.	1.50	1.30	1.50	1.30
Chollar.	1.50	1.30	1.50	1.30
Confidence.	1.50	1.30	1.50	1.30
Con. Imperial.	1.50	1.30	1.50	1.30
Con. Virginia.	1.50	1.30	1.50	1.30
Con. Pacific.	1.50	1.30	1.50	1.30
Crown Point.	1.50	1.30	1.50	1.30
Day.	1.50	1.30	1.50	1.30
Eureka.	1.50	1.30	1.50	1.30
Eureka Con.	1.50	1.30	1.50	1.30
Exchequer.	1.50	1.30	1.50	1.30
Grand Prize.	1.50	1.30	1.50	1.30
Gould & Curry.	1.50	1.30	1.50	1.30
Goodshaw.	1.50	1.30	1.50	1.30
Hale & Norcross.	1.50	1.30	1.50	1.30
Holmes.	1.50	1.30	1.50	1.30
Independence.	1.50	1.30	1.50	1.30
Julia.	1.50	1.30	1.50	1.30
Justice.	1.50	1.30	1.50	1.30
Martin.	1.50	1.30	1.50	1.30
Mono.	1.50	1.30	1.50	1.30
Mexican.	1.50	1.30	1.50	1.30
N. D. Diabolo.	1.50	1.30	1.50	1.30
North Belle.	1.50	1.30	1.50	1.30
Occidental.	1.50	1.30	1.50	1.30
Ophir.	1.50	1.30	1.50	1.30
Overman.	1.50	1.30	1.50	1.30
Potosi.	1.50	1.30	1.50	1.30
Pinal Con.	1.50	1.30	1.50	1.30
Savage.	1.50	1.30	1.50	1.30
Seg. Belcher.	1.50	1.30	1.50	1.30
Sierra Nevada.	1.50	1.30	1.50	1.30
Silver Hill.	1.50	1.30	1.50	1.30
Silver King.	1.50	1.30	1.50	1.30
Scorpion.	1.50	1.30	1.50	1.30
Syndicate.	1.50	1.30	1.50	1.30
Tioga.	1.50	1.30	1.50	1.30
Union Con.	1.50	1.30	1.50	1.30
Uta.	1.50	1.30	1.50	1.30
Yellow Jacket.	1.50	1.30	1.50	1.30

Sales at San Francisco Stock Exchange.

THURSDAY A. M. APR. 3.	AFTERNOON SESSION.
395 Alta.	1.35
450 Bulwer.	1.35
1350 Bodie Con.	1.35
300 Bodie Isle.	1.35
100 Belcher.	1.35
100 Belmont.	1.35
10 B. & Belcher.	1.35
100 Crown Point.	1.35
2150 Con. Virginia.	1.35
70 Day.	1.35
30 Goodshaw.	1.35
30 Gould & Curry.	1.35
400 Hale & Nor.	1.35
50 Holmes.	1.35
400 Mono.	1.35
175 Mexican.	1.35
30 M. White.	1.35
10 Navajo.	1.35
300 N. Belle Is.	1.35
2795 Ophir.	1.35
440 Potosi.	1.35
50 Syndicate.	1.35
380 Sierra Nevada.	1.35
100 Savings.	1.35
215 Union Con.	1.35
60 Yellow Jacket.	1.35

REMITTANCES to this office should be made by postal order or registered letter, when practicable. Cost of postal order for \$10 or less, 5 cts.; for registered letter, in addition to regular postage (3 cts. per half ounce), 10 cts.

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No. 252 Market St. Elevator, 12 Front St., S. F. Telephone No. 658.

A. T. DEWEY. W. E. KWER. GEO. H. STRONG.

A Plain Book on Assaying.

"ASSAYING GOLD AND SILVER ORES"—By C. H. Aaron—is a new work published by Dewey & Co., which is intended by its author to be available for the use of miners, prospectors and others who only care to know how to assay gold and silver ores. The author of this work is well known in the mining regions of the Pacific coast as a practical metallurgist of many years experience. His writings for the press and his two previous works ("Testing and Working Silver Ores," and "Leaching Gold and Silver Ores") have shown his ability as a writer. The little book is plainly and simply written, more especially for the use of those persons not familiar with chemistry. No symbols are used, everything being plainly stated and clearly described. The scope of the book is shown in its table of contents as follows: Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scoriafication; Capellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables. These assaying tables give simple directions for figuring out results. This is the simplest, cheapest and most easily comprehended work on assaying yet published. The volume comprises 106 pages, with illustrations, and is well bound in cloth. The price is \$1, postpaid. Published by Dewey & Co., MINING AND SCIENTIFIC PRESS office, San Francisco—1884.

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I know where there are immense deposits of coal, worth millions of dollars. I need from twenty thousand to fifty thousand dollars, or more, to LOCATE, EXPLOR and IMPROVE said coal lands, much of which is upon Government land. Any person having the money mentioned to invest can make arrangements with the advertiser to go out with him and see with his own eyes the immense quantity and value of said coal lands. I am fully convinced that any party investing in said coal lands can, in less than two years, realize at least one hundred dollars for every dollar invested. Any person possessing the requisite means and "business," can address for two weeks, appointing time and place for interview.

A. B. "COAL."
Care of E. R. Robinson, P. O. Box 1474, San Francisco, Cal.
N. B.—The advertiser can show the very highest testimonials concerning integrity and business capacity.

Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First street, a Rathford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. References as to above can be had upon applying to this office.

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FOR IRRIGATING PURPOSES
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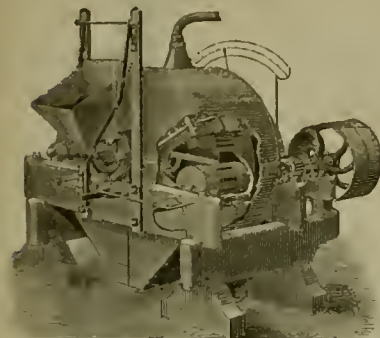
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First-Class Stationary Engine
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Right or left hand; 16x21 inch cylinder; fly wheel 3,500
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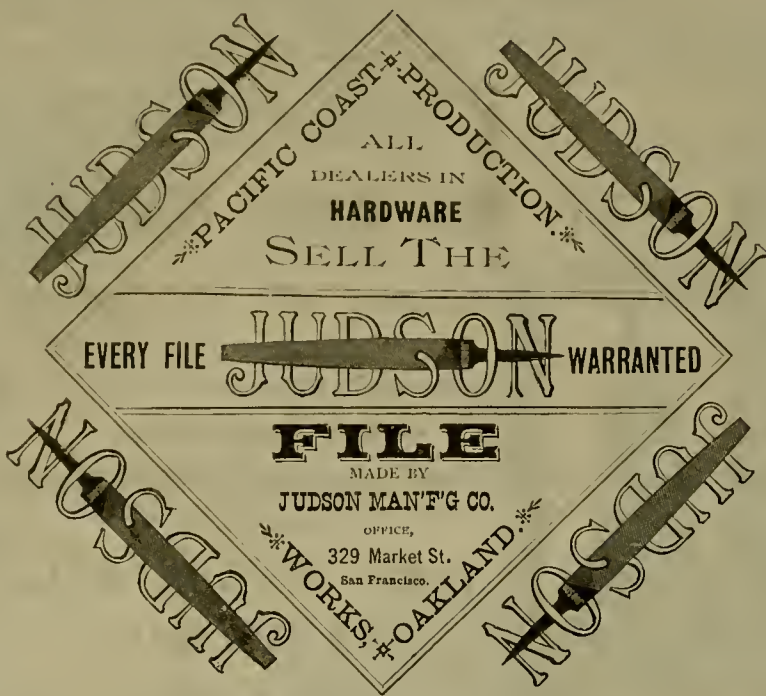
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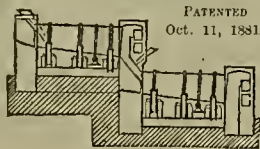
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Working up to 93 per cent. of Fire Assay, using 25 per cent. salt
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Sunny Suites and Single Rooms with or without Board
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cars pass the door. Location and Appointments unex-
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Valuable Vault for Sale at a Bargain

A contractor has a thoroughly burglar-proof vault for
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specially to Patent litigation.

Mining Companies.

Persons interested in incorporations will
do well to recommend the publication of
the official notices of their companies in
this paper, as the cheapest appropriate
medium for advertising.

DELINQUENT NOTICE.

Gover Mining and Milling Company.—Lo-
cation of principal place of business, San Francisco,
California. Location of works, Amador county, near
Drytown, California.

NOTICE—There are delinquent, upon the following
described stock, on account of assessment (No. 44) levied
on the 30th day of January, 1884, the several amounts set
opposite the names of the respective shareholders as
follows:

NAMES.	No. Certificate.	No. Shares.	Amount.
Bartlett, J. O.	47	405	\$12 15
Clawson, George.	69	75	2 25
Eastman, E. D.	480	200	6 00
Elwell, Mrs. S.	335	50	1 50
Elwell, Octave	463	50	1 50
Harris, James	56	50	1 50
Harris, James	57	50	1 50
Harris, James	58	50	1 50
Jewett, Thomas A.	141	150	4 50
Jewett, Arthur	442	175	5 25
Jewett, Arthur	440	475	14 25
Knox, Joseph A.	228	100	3 00
Knox, Joseph A.	229	100	3 00
Knox, Joseph A.	230	100	3 00
Knox, Joseph A.	231	100	3 00
Knox, Joseph A.	232	100	3 00
Knox, Joseph A.	233	100	3 00
Knox, Joseph A.	234	100	3 00
Knox, Joseph A.	235	100	3 00
Knox, Joseph A.	236	100	3 00
Knox, Joseph A.	237	100	3 00
Knox, Joseph A.	238	100	3 00
Knox, Joseph A.	239	100	3 00
Knox, Joseph A.	240	100	3 00
Knox, Joseph A.	241	100	3 00
Knox, Joseph A.	242	15	1 35
Knight, J. M.	206	125	3 75
Lagomazino, C.	49	75	2 25
Lagomazino, C.	50	50	1 50
Miller, W. J., Trustee.	243	1,750	52 50
Mitchell, Mary J.	263	250	7 50
Mitchell, Susie E.	261	250	7 50
Parsons, C. A.	477	500	6 00
Pratt, Freeman	496	50	1 50
Rogers, William A.	453	100	3 00
Rogers, William A.	454	150	4 50
Rogers, Mary T.	455	400	12 00
Stone, W. W.	292	200	6 00
Shiff, Gustave	136	125	3 75
Shiff, Gustave	137	100	3 00
Shiff, Gustave	138	100	3 00
Shiff, Gustave	139	100	3 00
Shiff, Gustave	140	100	3 00
Shiff, Gustave	141	100	3 00
Trefethen, George	101	300	15 00
White, John S.	100	375	11 25
Wilson, John S., Trustee.	263	250	7 50
Winter, Elisha S.	177	125	3 75

Also 45 shares of old issue, equal to 225 shares of the
new issue, of the capital stock of the said Gover Mining
and Milling Company:

NAMES.	No. Cert.	No. Old Shs.	No. New Shs.	Amount.
Ames, D. W.	254	25	125	\$3 75
Field, B. F.	169	10	50	1 50
Gorte, Thomas.	632	10	50	1 50

And in accordance with law, and an order of the Board
of Directors, made on the thirtieth day of January, 1884,
so many shares of each parcel of such stock as may be
necessary, will be sold at public auction, at the office of
the Company, Room 8, No. 402 Front street, San Fran-
cisco, California, on THURSDAY, the TENTH DAY OF
APRIL, 1884, at the hour of one o'clock p. m. of such day,
to pay delinquent assessments thereon, together with
costs of advertising and expenses of the sale.

MARK T. ASHBY, Secretary.

Office, 402 Front street, Room 8, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, March 1, 1884.

At a meeting of the Board of Directors of the above
named company held this day, Dividend No. 65, of twenty-
five cents (25c.) per share, was declared, payable on
WEDNESDAY, March 12, 1884, at the office in this city, or
at the Farmers' Loan and Trust Company, in New York.

WILLIAM WILLIS, Secretary.

OFFICE—Room No. 29, Nevada block, No. 309 Mont-
gomery street, San Francisco, Cal.

ASSESSMENT NOTICE.

Gould and Curry Silver Mining Company.

ASSESSMENT No. 47.

Levied.....March 7, 1884
Delinquent.....April 11, 1884
Day of sale.....May 5, 1884
Amount.....Fifty cents per share

ALFRED K. HURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Mont-
gomery Street, San Francisco, Cal.

San Francisco Pioneer Screen Works.

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Several first premiums received
for Quartz Mill Screens, and Per-
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SLOT PUNCHED SCREENS,
which are attracting much at-
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faction. This is the only estab-
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exclusively to the manufacture of
Screens. Mill owners using Battery Screens extensively can
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and promptly attended to.

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WM. BARTLING. HENRY KIMBALL

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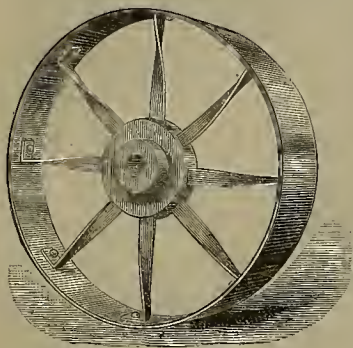
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Advantages of these Pulleys.

They are less than half the weight of cast-iron pulleys; are polished on the face; are made either crowned or straight, and are turned in the lathe the same as the best make of cast-iron pulleys.

They are carefully balanced. They are subject to no contraction strains, and can be run at very high speed without danger of bursting.

On account of their great lightness and the form of the arms, they absorb less power than any other pulley. They are the only pulley of the kind which runs true. They cannot be broken in transport.

TESTIMONIAL:

MATHER LANE SPINNING CO. (Limited),
LEIGH, ENGLAND, Nov. 5, 1883.

N. Macbeth, Esq.—Dear Sir: The Patent Steel Pulleys supplied throughout to our No. 2 Mill are working to our entire satisfaction.

They are very true, and are about 50 per cent lighter than the cast-iron pulleys in our No. 1 mill.

Yours faithfully,

For the Mather Lane Spinning Co. (Limited),
[Signed:] RICHARD T. MARSH,
Managing Director.

Risdon Iron & Locomotive Works,

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F. P. BACON, PRESIDENT

C. L. FOUTS, SECRETARY

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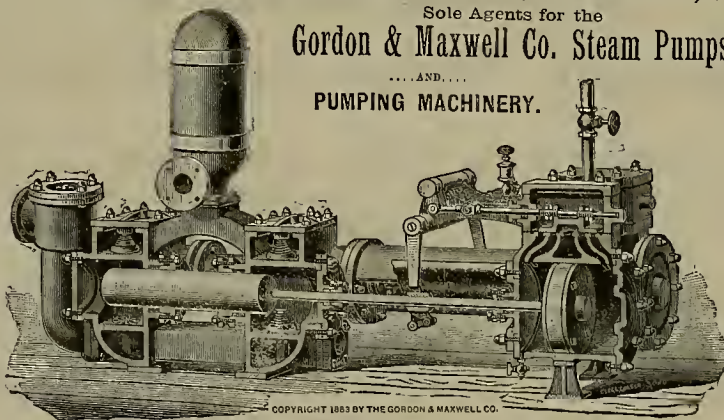
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Corner Beale and Howard Sts., San Francisco.

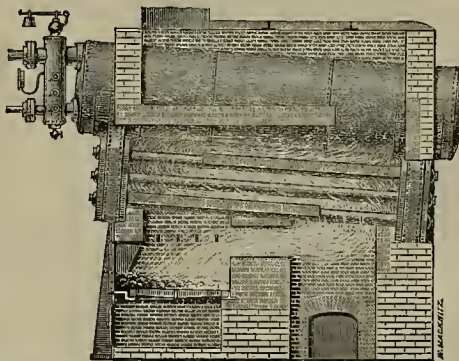
Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

TESTIMONIALS.

St. Louis, Mo., Sept. 28, 1883.
Messrs. Adolphus Meier & Co.—GENTLEMEN: We cheerfully certify that the "Heine Patent Safety Boiler" put up by you in our establishment has proved very satisfactory in its working. The chief points of excellence in the "Heine Safety Boiler" are its economy in fuel and space, freedom from scaling, aptitude for power and heating purposes, working equally well with clear and muddy water. We warmly recommend it to all using steam machinery. Yours truly,
ANHEUSER-BUSCH BREWING ASSN.

OFFICE OF Supt. OF ROYAL RAILWAYS,
BERLIN, Sept. 23, 1883.

To Mr. H. Heine, Civil Engineer: In reply to your inquiry of September 24, we respectfully inform you that the three boilers built under your patents, under steam since September 25, 1881, at the Alexander Place Depot, as well as the two at Friedrich Strasse Depot, under steam since September 22, 1882, have given good satisfaction, requiring no repairs whatsoever to date. The internal cleaning of the boiler was always accomplished



with ease on account of the convenient arrangement of the tube caps, the adhesion of scales being fully prevented thereby, and the boilers kept in prime condition.

(Signed): BRAUCKE.

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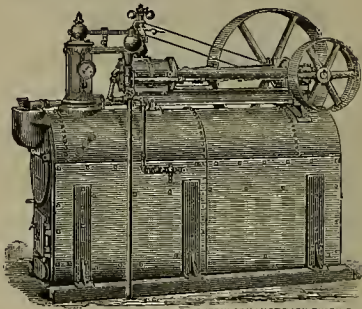
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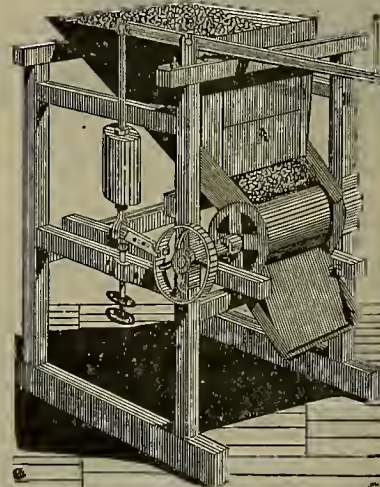
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[Patented May 28, 1882.]



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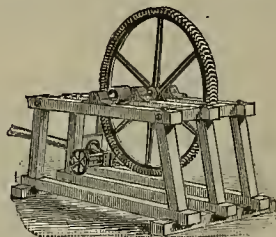
In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

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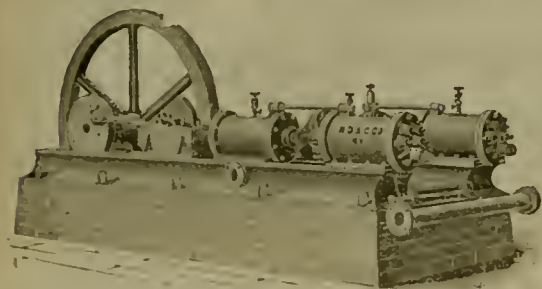
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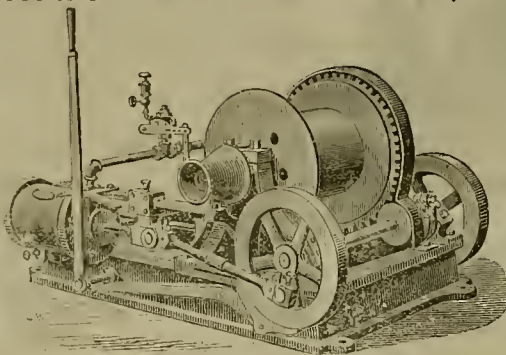
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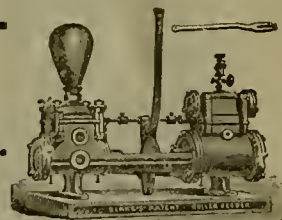
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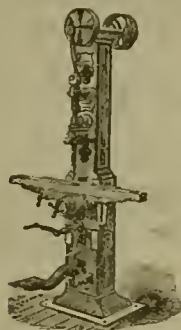
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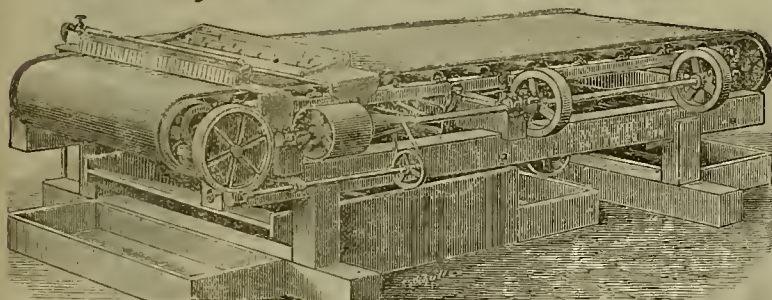
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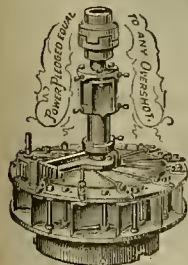
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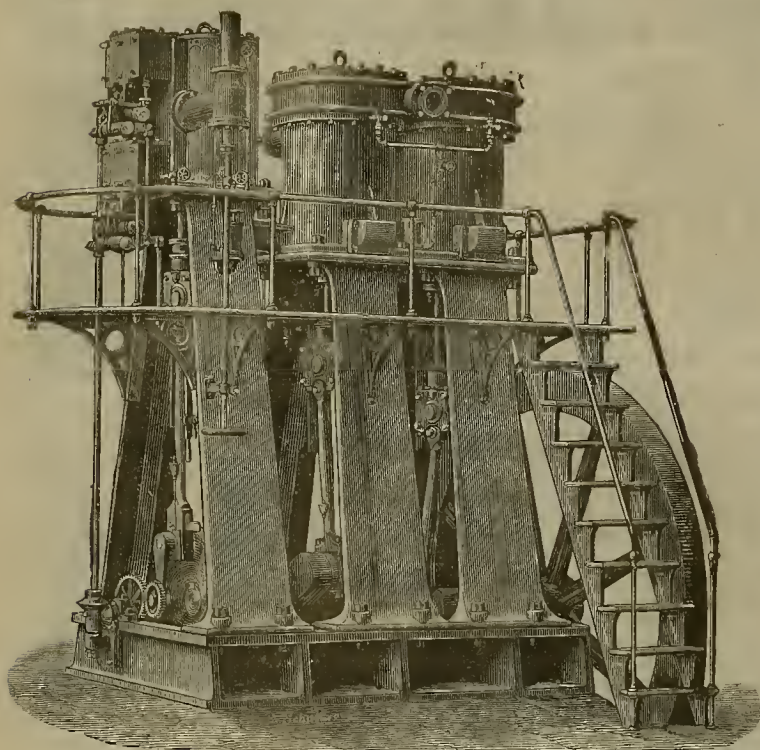
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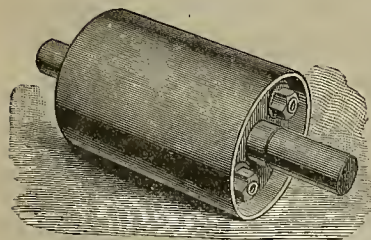
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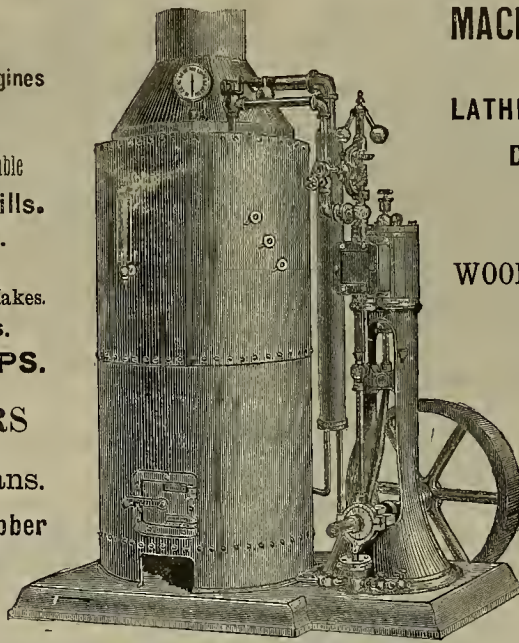
Steam Pumps of all Makes.
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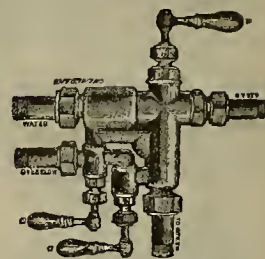
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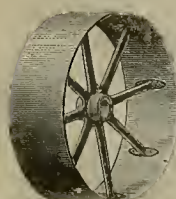
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Baker Rotary Pressure Blowers, Akron (Ohio) Hot-Polished Shafting,

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PAT. OCT. 25, 1881.

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For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over all other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrounding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO. San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 12, 1884.

VOLUME XLVIII
Number 15.

A Curious Rock Drill.

Wm. E. Peyton, of this city, has just secured a patent, through the MINING AND SCIENTIFIC PRESS Patent Agency, for a curious drilling machine. It consists of a drill holding a piston and spindle fitted in the bore of a barrel, and adapted to be driven forward to deliver its blows by an explosion in the barrel behind it, and to be returned by a spring. The object is to provide a drill of great power, capable of rapid and effective operation, and of such weight and cost as will adapt it for general use. The drill is to be mounted on a tripod or other ordinary support.

The drill-holding spindle is of such a length that its rear end, when fully in, extends back to the cartridge chamber, while its forward end projects beyond the end of the barrel a suitable distance. The spindle fits the bore of the barrel with sufficient exactness to secure and yield to the full effect of the explosion behind it, caused by the cartridge. The cartridge used may be made of shells filled with a small quantity of gun-cotton, nitro-glycerine, or any other suitable explosive, and may be of any required size or strength, the idea being, that a very small one, made at small cost, will answer the purpose. The explosion of the cartridge directly behind the end of the drill-holding spindle drives it forward to deliver the blow of its drill against the face of the rock. By reason of the spindle having to return to its place, being influenced thereto by its spring, some exhaust must be provided for the vapors and air. This is accomplished by tapping the bore at some point behind the limit of the forward movement of the rear end of the spindle, and running the exhaust passage in the most convenient direction. A cartridge tube automatically delivers the cartridge, and an ejector throws the empty shell through a discharge hole. The mechanism for feeding the cartridge to the chamber, exploding it and throwing out the shell is all automatic.

PATENTS.—The number of applications for patents is constantly on the increase. The issue for 1882 was 19,267; for 1883, 21,196. It is estimated that the number of issues this year will reach nearly, if not quite, 25,000. There seems to be no limit to human ingenuity. When the reader is reminded that over 5,000 patents have been taken out for washing machines alone, there will be no wonder at the multiplicity of devices for almost every conceivable work. Year by year the steps for developing the resources of the human mind, as shown in the Patent Office, seem to grow longer and larger.

COPPER CITY, Shasta county, Cal., is again deserted. This is the second time in twenty years that the place has been transformed from a thriving mining town to a deserted hamlet.

The Great Steel Canti-Lever Bridge.

The principle of the canti-lever plan is that of a trussed beam supported at or near its center, with the arms extending each way, and one end anchored or counter-weighted to provide for unequal loading, as is shown to some extent by the accompanying cut. In practice it is entirely new, this being the only bridge completed upon this principle. The Firth of Forth bridge in Scotland, and the Fraser river bridge on the Canadian Pacific, are now being built on this plan.

The total weight of the iron and steel entering into the composition of this massive structure is 3,000 tons. The bridge is of sufficient width for a double track, and is built to carry upon each track at the same time a freight train of the heaviest kind extending the entire length of the bridge, headed by two "consolidation" engines, and a side pressure of

tal uplifting force that can be exerted on each of the shore arms of the canti-lever is 340 tons, and the weight of each shore anchorage is 800 tons. It will be seen that every single piece of material is five times as strong as it actually need be, so that the bridge can be strained to only one-fifth of its ultimate strength. Each ingot of steel was submitted to a chemical analysis, and the samples to a mechanical test. The standard of excellence adopted was more severe and exacting than usual, and all steel that failed to meet the requirements was rejected. The contractors therefore say, "This bridge, in material and workmanship, has no equal."

The bridge was rigorously tested on the 20th of December, and under the tremendous weight of twenty locomotives and twenty-four heavily loaded gravel cars, showed a temporary deflection of but six inches. It is probably one of the strongest, as it is one of the most elegant,



THE STEEL CANTI-LEVER BRIDGE OVER THE NIAGARA RIVER.

thirty pounds per square foot, which pressure is produced by a wind having a velocity of seventy-five miles an hour. The total length of the bridge proper is 909 feet and 9 inches, divided into two canti-levers of 395 feet on the Canadian and 395 feet on the American side, supported on steel towers arising from the water's edge. A fixed span of 119 feet and 9 inches is suspended from and connects the river arms of canti-levers. The clear span across the river is 494 feet and 9 inches, being the longest bouble track truss span ever yet built. The bridge spans a chasm of 839 feet from bluff to bluff. The excavations were carried down until solid rock was reached, when blocks of "Beton Coignet" twenty feet wide and forty-five feet long and ten feet thick were put in. These formed one simple mass capable of withstanding a pressure almost equal to the best Quincy granite, and so distributed the load of 1,600 tons that comes upon each pair of steel columns as to produce a pressure of but twenty-five pounds per square inch on the natural formation. Upon these Beton blocks, four in number, was built masonry of the most substantial character, carried up fifty feet above the surface of the water. On these the steel towers rest, rising 130 feet and five inches above the masonry, and upon these are set steel super-structures. The total weight resting on each of the towers under a maximum condition of strain is in round numbers 3,200 tons. The to-

bridges in the world. Passenger trains now run solid over the Canti-lever Bridge, stopping long enough at Falls View Station to give passengers the very finest view of the falls obtainable from any point, and again at Niagara Falls, Ont., and Niagara Falls, N. Y., on their way to Buffalo.

MINING MAP OF INYO COUNTY.—J. N. Keeler has issued a mining map of Inyo county on a scale of twelve miles to the inch, giving all the mining districts and an explanation of the character of ores in the district. He also gives the location of the quartz mills, saw mills, arrastras, furnaces, etc. Printed with the map is a terse description of the resources of the county. The districts are defined by name and boundary line. It is to be regretted that similar maps do not exist of the other counties of the State. Mr. Keeler's idea is a hint to some of the more progressive residents of other counties who want to disseminate information concerning them. Inyo county has an area of 12,000 square miles, and has the credit of having produced at least two-thirds of the total silver product of the State. The map may be procured by addressing "Inyo County Map, 328 Montgomery Street, San Francisco." It is a small lithograph on thin paper and may be sent in a letter.

An international electrical exhibition is to be held in Philadelphia next fall.

Cable Railway Grips.

The Market Street Cable Company has brought suit against the Clay Street Hill Railway Company, and the Presidio and Ferry Railway Company, for infringement of patent on the grip now used by the last two mentioned companies, the Market street company owning the Eppelsheimer patent, which they claim is being infringed. The complaint states that Wm. Eppelsheimer, who was constructing engineer of the Clay Street Hill Cable Road, the first built in this city, was the original inventor of an improvement in that class of grips to be used on cable railroads, which has since become known as the "Hallidie Grip." That the same was a new and useful invention and consisted generally of combining four inclined carrying pulleys—which were designed for picking up and supporting and carrying the moving cable, while the car or dummy

to which the grip was attached was standing still with the jaws of the grip by means of two yielding bars. Each one of said respective rollers was forced to revolve upon one of four respective journals, one of which journals was fixed to each respective end of said two yielding pulley bars. One of said bars was respectively attached longitudinally to each jaw of the grip by means of two bolts, which passed from the jaw loosely through the longitudinal pulley bar. An annular India rubber yielding spring or cushion, made somewhat like a very large check washer, was then placed upon each

one of said bolts, and a large nut was then screwed upon each one of said bolts, so as to force the rubber springs against the longitudinal pulley bars, and hold them in position.

The bars held the pulleys a little in advance of the gripping dies, so that when the dies were loosened from the cable to let the car stand still the pulleys would be pressed forward by the bars and rubber springs with sufficient power to hold and carry the moving cable independently of the dies, and when it was desired to grip the cable for starting the car the rubber springs would yield enough to allow the jaws and dies to advance and grip the cable, while the pulleys and pulley bars remained substantially unchanged in their positions. Patent was issued to Wm. Eppelsheimer March 17, 1876, and his right was assigned recently to the Market Street Cable Co., of this city. The suit is in equity, and an injunction is asked for to prevent the use of the grip on the the Clay Street and Presidio roads.

A BOOM FOR INYO.—The indications are there will this summer be quite a mining boom down in the Inyo country. It is a region that promises well for both the man of small means and the capitalist. There will soon be mills and furnaces that will do custom work.

A large number of coal miners in Western Indiana have been on a strike for nearly two months.

The Leaching Process.

[CONTINUED FROM LAST WEEK.]

Pilot Charge No. 2.

Roasted in a five-hearth furnace.
1 P. M.—Entered fifth hearth; sulphur began to burn half an hour afterwards.

2 P. M.—Changed to fourth hearth; the hot pulp ran over the whole hearth like quicksilver.
3:30 P. M.—Changed to third hearth. The sulphur burned strongly, the arch becoming completely red. Very little wood was kept in the fireplace.

5 P. M.—Changed to second hearth. The charge did not swell; it ran before the rake, and great care had to be used to prevent its running out at the working-door.

6 P. M.—Added 8 per cent salt, well dried and finely sifted. The charge immediately began to swell and to give off copious torrents of gases.

8:30 P. M.—Entered first hearth, the charge still containing some sulphur. Hardly any wood was kept on the fire-bars. Still larger volumes of gases were evolved; the charge was much increased in bulk.

A sample was taken from the furnace, and a chlorine assay made in the usual way showed 76.2 chloridized, the two 300 grain samples giving buttons both weighing 0.118 grains.

The pulp itself only assayed 164 milles, having, in its passage through our fire-ovens, taken up a large amount of poor ores from corners, etc. Our furnaces were well scraped before introducing this ore, and a charge of tailings was put through ahead of it to clean off the floors and corners.

11:30 P. M.—A fresh sample taken; buttons from 300 grains weighed .026 and .024 grains = 96 per cent chloridized.

12:30 A. M.—Charge still contained a very little sulphur.

1:30 A. M.—Charge commenced to grow dark; the gas evolved smelt strongly of chlorine; no smell of sulphurous acid could be perceived.

2 A. M.—The charge was considered to be roasted dead, and was withdrawn.

The above chlorine assay proves that it might have been withdrawn two and one-half hours before it was.

The heap, after cooling naturally, was sprinkled, and two samples of 300 grains were taken twenty-four hours afterward, and gave .028 and .038 grains = 94.5 per cent chloridized.*

The roasted pulp was weighed: First weight, 1,704 pounds; second weight, 1,700 pounds; deducting 7.52 per cent moisture = about 1,570 pounds net.

The raw pulp having originally weighed 1,000 pounds, it took up from tailings, etc., from hot-toms and corners, during its passage in five hearths 9' x 9' each, 570 pounds.

This, of course, vitiates the result very considerably, but we were very loath to pass through the large parcel without having some insight into the working of the ore. Nothing analogous happened on working the large lot, because the first charge or two were the only ones affected.

A further chlorine assay of the roasted pulp was made, buttons from 300-grain samples, digested with hyposulphite, giving 0.028 grains and 0.030 grains = 94 per cent chloridized.

Experiments were made with a view to ascertain the loss occasioned by washing the roasted pulp with spring water. 100 grains were washed by decantation and filtration; the residue yielded by assay a button weighing 0.033 grains, the ore, before washing, containing 0.164 per cent.

Nothing analogous to this occurs on the large scale, because the brine is so rapidly diluted by the influx of large quantities of water. One quintal of roasted pulp from Pilot No. 2 was washed several hours in a small vat; assays of the ore after this wash gave 169 milles and 170 milles—the original unwashed ore assaying as before, 164 milles. There was, as before, some loss of silver in this operation, but the water removes the excess of common salt and certain soluble metallic salts—probably, in this case, mostly sulphate of iron—so that the washed residue was richer in silver than the original, its weight being less.

Two more samples from this roasted pulp were assayed, giving 166 and 158 milles.

The Main Lot.

The weights of raw pulp were as follows:

16,639 pounds was the weight of the main lot roasted.
100 pounds were sent to San Francisco.
1,000 pounds were taken by Pilot Charge No. 1.
200 pounds were added to roasted pulp of Pilot Charge No. 1, forming Pilot No. 1 b.
1,000 pounds were taken for Pilot Charge No. 2.
50 pounds taken for samples.
221 pounds of small rock, gravel, etc., which remained in the mortar-bed after finishing the stamping.
19,210 pounds.
720 pounds difference in weight.
* We use a wet mill, and in stamping dry, cannot prevent "slust loss."
Part of the loss is moisture expelled from the sheet-iron plates, and part was due to the fact that the ore was partially burnt on the plates.

20,000 pounds weight of ore.

Free sulphur was condensed on the upper strata of the ores lying on the sheet iron plates.

The pulp (main lot) was twice weighed, once on entering room for stamps—16,656 pounds—

* With this charge, as with its predecessors, no pains were taken to obtain it from all parts of the pile of raw pulp, as we were not then aware of the great differences of grade existing between the different classes stamped. The roasted pulp assayed by the crucible, 0.164 per cent and 0.163 per cent; by scorification, 0.138 per cent

once on leaving room for furnaces—16,622 pounds—average, 16,639.

The assays were as follows. Samples were taken after removing the two pilot lots and the sample for San Francisco:

364 milles = 106.2 ounces per ton of 2,000 pounds.			
370 "	107.7 "	"	"
375 "	108.4 "	"	"
378 "	110.2 "	"	"
377 "	110 "	"	"
374 "	109.1 "	"	"
376 "	109.7 "	"	"
376 "	109.7 "	"	"
380 "	110.8 "	"	"
381 "	111.1 "	"	"

Average, 375.5 milles (0.375 %) = 109.4 ounces per ton.
The silver contained is 16,640 pounds @ 0.375 per cent = 62,400 pounds avoirdupois.

Roasting of Main Lot.

Before charging any of this lot, four charges of tailings were sent ahead to clean off hearths, corners, etc.; since these tailings did not assay more than 0.005 per cent, any small residue of them remaining in the furnace may be regarded as neutral. The passage of these inert tailings left the furnaces cold, and the first ore charges worked very slowly.

The ore was roasted in a six-hearth reverberatory furnace, each hearth being 9 feet square. Each charge weighed 1,000 pounds. With a more intimate knowledge of the ore, very much larger charges can be used.

The salt used was eight per cent of the weight of the ore, i. e., 80 pounds to each charge.

6 P. M.—Entered sixth hearth.

7 P. M.—Changed to fifth hearth, a new charge entering the sixth.

8:30 P. M.—Changed to fourth, there being no signs of combustion of sulphur, although the second hearth was completely red.

9 P. M.—Second charge changed to fifth hearth.

9:15 P. M.—Third charge entered sixth hearth. Sulphur began to burn in first charge in fourth hearth.

10 P. M.—Changed first charge to third hearth; the hearth became red-hot through the energy of combustion of charge.

10:15 P. M.—Changed second charge to fourth hearth; its sulphur began to burn.

10:45 P. M.—Changed third charge to fifth hearth.

11 P. M.—Fourth charge entered sixth hearth.
11:30 P. M.—First charge entered second hearth.

11:45 P. M.—Second charge entered third hearth; it was red-hot.

12:30 A. M.—Added the salt to first charge.
1:30 A. M.—Changed it to first hearth; it still emitted sulphurous fumes.

2:30 A. M.—Added salt to second charge while yet in the third hearth. This was done to begin the chlorination in that hearth, so that less should remain to be done in the other two.

3 A. M.—Sulphur began to burn in the fifth hearth. There were signs of very active chloridizing in the first hearth.

5:30 A. M.—First charge was considered done, and withdrawn.

Sulphur began to burn in the sixth hearth; it will be observed that a cold furnace fifty-four feet long was very rapidly warmed up. This ore can be chlorine-roasted with a very small expenditure of fuel.

8 A. M.—Second charge was drawn. Another charge received its salt in the third hearth.

9 A. M.—The second, third, fourth and fifth hearths were completely red-hot, although very little wood was kept on the fire-bars; the fire-place measures only 4' 6" x 1' 10", the bridge being 1' 1" high.

The charge in the fire-hearth always appears dark in color, only glowing when moved with the rake. It speedily assumes the appearance of well-roasted ore, even when samples removed from it give off a strong odor of sulphurous acid; i. e., when it is known to contain intermixed raw sulphides.

11 A. M.—Charge No. 3 was drawn. After this the following charges continued to be drawn at intervals of from two to three hours; salt was invariably added in the third hearth.

In the night we saw plainly that the three hearths furthest from the fire-place were much hotter than the three nearest to it. This indicates the advantage of a continuous progressive furnace for this ore.

We can see no reason why this ore should not be roasted fast by people accustomed to it; the furnace might be as long as eighty feet. If a mechanical furnace be used, the ore could be advanced to the red-hot stage by the waste heat from it.

As soon as our own ores entered the furnace, after the last charge of these was done, the furnace rapidly began to cool.

The assays of roasted pulp were as follows:

323 milles = 94.2 troy ounces per ton of 2,000 pounds			
315 "	91.9 "	"	"
313 "	91.3 "	"	"
316 "	92.2 "	"	"
313 "	91.3 "	"	"
313 "	91.3 "	"	"
324 "	93.6 "	"	"
312 "	91.0 "	"	"
311 "	90.7 "	"	"
312 "	91.0 "	"	"

Average, 314.9 milles = 91.8 troy ounces per ton of 2,000 pounds.

The ore was twice weighed:

First weight,	17,454 pounds.
Second weight,	17,564 "

Mean, 17,519 "

As was done with the raw pulp, a small portion was taken with a U tool from each handbarrow on weighing; half the samples are from the first weighing, half from the second.

(CONTINUED NEXT WEEK.)

The Tribute and Contract Systems of Mining.

In speaking of the California group of mines in Colorado, the *Mining Gazette* says:

As the production of these mines is attracting universal notice just now, a summary of the yield and developments of the past months, and some comments on the methods which have accomplished these results, must prove of interest to all mining men.

From June 1st to December 31st the production of the California mine was 11,872 tons, worth \$136,839 58, or \$11 52 net per ton. The ore discovered and left as reserves was equal to that extracted.

The ground excavated during this period was 1,339.35 fathoms. This averaged seven tons to the fathom. The main shaft was sunk 81 feet.

For January of this year the output was 2,397 tons, returning \$26,213 81, the net profit being \$10,242 69. The yield for February and March has exceeded that of the preceding months, though the figures are not at hand.

The tribute system which is most adopted in the California and other mines under the same management, commends itself for several reasons. The lessees are required to work full shifts as men on day's pay, and are under the same supervision and restrictions. Their interest requires them to save all the ore possible, especially the smelting ore, which generally goes in part to waste under the other systems.

The following figures will illustrate how far more careful the tributers were of the smelting ore than the contractors during the six months above referred to, and that even the milling ore extracted was better assorted: In that period the contractors took out 9,161.12 tons milling ore, averaging \$8 49 per ton, and 238.22 tons of smelting ore, averaging \$88 50. Now note the proportion. The tributers extracted 2,277.68 tons milling ore, worth \$8 56 a ton, and 215.32 tons smelting ore, worth \$86 49 per ton. To show the advantages of saving the smelting ore, the following comparison is made:

One ton of smelting ore, say at \$84, is equal to sixteen tons of average grade milling ore, or ore yielding 4 ozs. bullion to the cord. Thus 16 tons, or two cords at 4 ozs. per cord equal 8 ozs. bullion, which at \$15 50 equal \$124,000. The cost of hauling to Black Hawk and milling in company's establishment at \$20 per cord is \$40, thus leaving \$84. That is to say an increase in the smelting ore output is a direct gain in every way.

Near Silver Plume the 7-30 mine is worked on the same plan and has of late made a larger profit to the owners than any mine in Clear Creek county. They started in with little or nothing, and now they are rich men. Neither the 7-30 nor the California group is especially rich, but practical methods have been adopted and the proceeds are not frittered away in extravagant salaries and unnecessary improvements. The success of such properties does immense good to the mining interests. Capitalists gain confidence. Managers, superintendents and foremen obtain credit, and feel pride in their work. Laborers are insured regular instead of spasmodic work. Though their profit for a time may be smaller, in the long run they are better off. Their interest becomes identical with that of their employees. To make a success of it, it must be conducted on business principles. The mining superintendent, foreman or director who squanders the money of his company carelessly, or for individual gain is as culpable as the bank cashier or clerk who misuses funds entrusted to the institution which he represents.

Besides the California mine, the Hidden Treasure, the Kansas and Kent Co., are under the management of the Rickard Bros., represented here by Mr. Alfred Rickard.

The Kansas has a shaft 1350 and the Kent Co. 1000 feet deep. They are both self-sustaining, being developed on their own resources. In this county the Kohinoor, the Donaldson and Champion mines, with their new mill, and in Leadville the LaPlata mine and smelter are under the same mining firm.

MANUFACTURING SODA.—The Candelaria

True Fissure says: W. D. Linton has just returned from a place near Double Springs, Schurz being the nearest railroad station, where he and a number of men have been employed for some time in excavating about fifty square feet of land, divided up into large square vats for evaporating purposes. The native soda, found in immense quantities near at hand, will be put into the form of a solution, and will then be run into these vats, where it will be acted upon by solar evaporation. After all the water is gone the soda is in quite a pure state. It is then removed and shipped away for the reduction of borax and other uses.

PRETTY ROUGH.—It is pretty rough on the hydraulic miners of California that they cannot work their mines this season, when there is a promise of a more abundant supply of water than for many years. To see all the water running by is enough to make the miners blow up the mountains with dynamite and send an avalanche of mud down upon the cow counties. —*Virginia Enterprise*.

A Wild Stampede.

The Excitement in the Cœur d'Alenes.

A gentleman just back from the gold fields of the Cœur d'Alenes says there are now about 4,000 men in the mines and they are pouring in in a perfect stream, not only by day time, but up to 12 and 1 o'clock at night. Many of them are so weak and tired on reaching the camp that they are barely able to walk. It will not be more than a few weeks until the population of the gulch will be fully twenty thousand.

It is the wildest stampede, he says, that he ever saw. This was especially the case at the time when he went into the camp. Many of the stampedeers were so anxious to get to the gulch that they would not take time to lay in a sufficient amount of grub to carry them over the trail, taking it for granted that plenty could be bought along the way. Thus it was that many were compelled to go all the way from Trout creek to the mines, a distance of about 35 miles, without a bite to eat and loaded down with their blankets and prospecting outfit. This was several weeks ago, but more recently lunch stations have been opened along the way.

The most interesting feature of the stampede at the time he went into the mines was the wild excitement which prevailed among the majority of the men. Many of them were of the pilgrim class, and couldn't tell a placer mine from a cabbage patch. Consequently they were easily imposed upon by the old-time stampedeers, who told them the most glowing tales in regard to the richness of the mines ahead of them. They were also informed that hundreds of men were pouring into the gulch daily, and that according to all reports the rich mines would soon be all taken. There was a perceptible quickening of speed on the part of the eastern element every time these or similar stories were circulated.

For the first third of the way from the railroad the pilgrims would pack their outfit intact. Then they would hear (and swallow) some of the exciting tales, and might be seen to secretly throw away a part of their load. By the time they reached the summit they would not have anything but their blankets and a little grub left. Then they would pull out for the gold fields with renewed vigor. But when they got half way down the slope the actual stampede would begin. Grub and blankets would be tossed to one side, and the hurrying throng would press onward like a lot of wild men, each striving to reach the golden goal first. Great must have been the disappointment on reaching Eagle City to find that no mining was being done, that none had been done since winter set in, and that the shining treasure, if it existed at all, was buried beneath deep banks of snow, which would not disappear until summer time.

This wild stampede left the trail in the condition in many respects of the line of retreat of a defeated army—blankets, provisions, tools, sleds and almost everything of a portable nature required in a new camp were strewn along hither and yon on both sides of the trail. The late comers, however, profited by it, and were enabled to fit themselves out with almost anything they wanted while going into the mines without the expense of buying or the labor of carrying.

Our informant is of the opinion that the mines will pay well, although it is impossible to tell much about them under present circumstances, for no actual mining is as yet in progress. But from the examinations which he made while in the camp he believes there is gold there and plenty of it. We hope so.

Money Spent on Harbors and Rivers.

A document just issued from the office of the Chief of the United States Engineers makes the following showing of the amount of money spent by the Government on rivers and harbors, beginning with the earliest appropriations:

States.	Net Expenditures.
Alabama.....	\$866,142.37
Arkansas.....	315,000.00
California.....	1,494,428.54
Connecticut.....	1,627,445.54
Delaware.....	3,043,626.20
Florida.....	600,352.84
Georgia.....	1,364,064.07
Idaho Territory.....	10,000.00
Illinois.....	2,252,304.50
Indiana.....	786,158.77
Iowa.....	2,400.14
Kentucky.....	367,500.00
Louisiana.....	147,800.88
Maine.....	1,401,889.36
Maryland.....	1,485,703.70
Massachusetts.....	2,024,779.88
Michigan.....	7,828,356.10
Minnesota.....	447,000.00
Missouri.....	22,000.00
Mississippi.....	295,175.21
New Hampshire.....	175,000.00
New Jersey.....	387,406.58
New York.....	9,539,973.95
North Carolina.....	2,261,202.93
Ohio.....	2,857,081.39
Oregon.....	643,596.63
Pennsylvania.....	1,067,101.30
Rhode Island.....	736,013.06
South Carolina.....	931,342.13
Tennessee.....	85,000.00
Texas.....	2,166,133.35
Vermont.....	54,311.07
Virginia.....	1,683,375.17
Washington Territory.....	2,000.00
West Virginia.....	1,916,587.89
Wisconsin.....	4,916,065.66
District of Columbia.....	253,202.00
Miscellaneous.....	38,349,108.76
Repairs, etc.....	3,076,021.91
Surveys.....	4,951,424.19
Dredging machines, etc.....	1,115,321.43
Grand total.....	\$105,796,503.08

MECHANICAL PROGRESS.

Short and Long Boilers.

Short boilers are found to do more work, in proportion, than long ones. This has been confirmed by experiments on the rapidity of evaporation by Mr. Charles Wye Williams and others. Also short boilers strain less than long ones and are therefore less liable to need repair. A length of 30 feet should be the maximum, while with regard to the minimum some Lancashire boilers, to suit particular positions, have been made as short as 21 feet and found to work well, though the fittings become rather crowded. The length recommended and now generally adopted is 27 feet.

The diameter of the boiler is governed by the size of the furnaces, which should not be less than 2 feet 9 inches, to admit of a suitable thickness of fire, and afford convenience in stoking. Thick fires are more economical than thin ones.

The space between the two furnace tubes should not be less than 5 inches and that between the furnace tubes and side of the shell 4 inches in order to afford convenient space for cleaning and free circulation of the water as well as to give sufficient width of end plate for enabling it to yield to the expansion and contraction of the furnace tubes. With this width of water space it will be found that furnace tubes, having a diameter of 2 feet 9 inches, require a shell of 7 feet, which will afford a headway of about 2 feet 9 inches from the crown of the furnaces to the crown of the shell. A furnace 3 feet in diameter gives room for a better fire than one 2 feet 9 inches, but it requires a shell 7 feet 6 inches in diameter. For high pressure the smaller diameter of 7 feet is generally preferred, and has come to be adopted as a standard size for well boilers throughout Lancashire, though one of 7 feet 6 inches makes a good boiler and gives greater horse-power per foot of frontage than one of 7 feet diameter.—*Age of Steel*

UNIFORMITY OF SHOP HEAT.—Measurements of the metals in working, says the *Scientific American*, are reduced to such exactness that very slight changes of external condition affect their integrity. When a company that produces exact standards of measurement claims an accuracy of one-five-hundred-thousandths of an inch in linear measurement, and advertises to produce it, and another producer of tools of exactness insists on fitting work to one fifty thousandth of an inch, it may be considered that extraneous influences not formerly noticed may be sufficient to seriously affect these measurements. One of these influences is that of shop temperature. Exact measurements must be taken under certain conditions; when these conditions vary within limited periods, or while the job to which they pertain is in progress, there will be a difference that in some cases would be sufficient to impair the accuracy of the work. In one instance noted, a planer stood by the wall of the shop, the head upright close to a window. When the planer stopped on a winter night there was on its platen a lathe bed nearly finished, the V's lacked only the finishing chip. The tool carriage on the cross saddle had been left on the inner or shop side. In the morning, after a blustering, cold, windy night, the operator thought to test the theory of cold contraction, and he set the square-nose finishing tool to touch the top of the V on the shop side and ran it across to the wall side. The cutter scored across the cold side of the planer, plowing a groove of at least one thirty-second of an inch deep in the opposite V, a distance from the other V of but little over two feet.

A SHEET-METAL GAUGE ADOPTED IN ENGLAND.—A meeting of British iron manufacturers was held on February 28, at the Birmingham Exchange to take action respecting the gauge for the sale of hoops and sheets after March 1, when the new imperial wire gauge would come into operation. The question of the best gauge for adoption gave rise to considerable discussion. The Whitworth gauge, which some wanted, was objected to on the ground that much trouble would be experienced in dealing with foreign buyers, who had adapted all their transactions to the old wire gauge. Others suggested a modified Birmingham gauge, but the final decision of the meeting was expressed in the following motion, which was carried unanimously: "That this meeting confirms the resolution passed at the meeting held on December 6, viz.: 'That this meeting adopts the gauge known as the Birmingham gauge,' and further resolve, that such Birmingham gauge shall be the proposed standard gauge for sheet and hoop iron already printed and issued by the South Staffordshire Ironmasters' Association to the manufactured iron trade, and by them approved and also deposited with the Board of Trade, and that such gauge shall in future be used under the initial letters 'B. G.'"

AN INQUIRY INTO THE ORIGIN OF INVENTION.—In an interesting paper read before the Anthropological Society of Washington, Mr. Franklin A. Seelye gave the results of an investigation, the object of which, he stated, was to consider the nature of the first steps in mechanical invention, far back of history, of tradition, and of revelations of archaeological research. He showed by several examples that every invention, however complicated, was the end of a process of evolution starting from the

most primitive beginning. He traced thus the evolution of the modern steam engine as well as the bow and arrow of the savage; they could all be traced back to rude types in a few mechanical expedients which man possessed at his earliest origin, and employed, guided by his own selection, and which have been supplemented by other expedients from time to time discovered or invented. He then asks the question, "What were the expedients of primitive man?" and replies that the mechanical expedients possessed by the earliest human beings were such, and such only, as they possessed in common with the brutes. The expedients of the latter were then described by the author, who finally led up to the argument that nothing less than man with his reasoning powers could have made improvements upon them. Incidentally he remarked that the finished product always precedes the machine or invention which produces it, and no art is known to us that has not grown up from simpler and ruder arts.

FINISHING BY PRESSURE.—Articles of wrought iron and steel, as parts of machines, guns and small tools are largely made by the process of drop forging. Thus shaped in dies they require only surface in finishing, as their forms are secure and nearly perfect. Many of these articles require, however, the milling machine or hand filing to dress them previous to polishing. This work can be saved in many instances by compression finishing. Sewing-machine shuttles and small gun parts, pistol frames, fork wrenches, and many other small pieces, are subjected to pressure while cold, with the result of producing a very clean and even surface. Under a pressure of 800 tons a small piece, like the hammer of a percussion lock gun, comes out of the compression dies as clean and smooth as the faces of the dies themselves will permit. In fact, the process is exactly like that of minting gold, silver, nickel and copper blanks. The cold metal is compelled to flow and fill the dies. Under such a pressure drop forged Norway iron, after it has been subjected to the tremendous impact of the drop forging hammer, will yield to a permanent compression of one four-hundredths of an inch.—*Sci. Am.*

A LONG STRAIGHT EDGE.—An absolutely exact straight edge of more than 36 inches is a wonder of mechanism. One of 6 feet was not recently believed possible, although several had been made on different plans of web-like and truss construction. It has been claimed, however, that almost absolute exactness has been secured by a straight edge 12 feet long. The appliance looks like an arched truss, the highest spring of the arch being only 20 inches in a length of 12 feet. The space between the chord and the spring is filled with diagonal lattice work; the whole is a casing on which no opening with the hammer is allowed. Three of these straight edges have been made, one remaining in the establishment where built and two going to technical colleges. Each of them has been tested by each other, and proved to be practically perfect. Such a tool is invaluable in testing lathe and planer beds.—*Sci. Am.*

ASBESTOS ROPE.—The manufacture of rope from asbestos is likely to become an industry of considerable importance in England, the strength of the article being estimated at about one-fourth that of ordinary hemp rope of the same diameter. Rope of this material of one and one-half inches in diameter is stated to have a breaking strength of one ton, and twenty feet of it are calculated to represent a weight of thirteen and one-fourth pounds. Some of the purposes, as enumerated, to which this kind of rope is especially adapted are theaters, fire brigades, and means of escape from dwellings and public buildings, its advantage being that it will not break and drop its burden if the flame burns upon it. It is made like ordinary rope, and is spun from Italian asbestos thread.

A MAMMOTH CHAIN.—Two heavy chains of the following dimensions, for use on the large floating bridge connecting Portsmouth and Gosport have recently been made in England. Each chain was 640 yards in length, consisting of nearly 5,000 links, the diameter of iron being 11-16 inches, and the weight of each chain 21 tons, tested to a tensile strain of 40 tons, or 20 per cent, over Admiralty test, the actual breaking strain being proved to be 70½ tons. Each chain was loaded upon a carriage weighing 11 tons, the load for road transit being 32 tons.

BRICK VS. IRON.—An architect of New York, speaking of building material, says: "Under the rational order of things, brick will survive centuries without showing its age, but an iron structure under the best care will begin to show the weight of years by the close of the first century."

FLY WHEELS LOADED WITH LEAD.—Small fly wheels, cast hollow and loaded with lead, is a foreign notion that promises to become popular in this country. They afford the same centrifugal power as the large wheel, cost less and take up less room.

GOOD IRON, whatever be its name, should possess the following qualities of its minimum degree, viz.: Tensile strength, 40,000 pounds per square inch; contractility, 15 per cent., and elastic resistance of not less than 25,000 pounds per square inch, the last the most important.

SCIENTIFIC PROGRESS.

The Winds and the Waves.

One of the first things to be observed in a storm is the way the wind acts. It does not blow regularly, but in gusts. At one moment it bends over the branches of the trees; in the next it has loosened its hold and let them fly back. We see it swelling out a ship's sails into a puff; a minute later the sails hang, flapping as if they had been struck down.

We can account for these phenomena and explain the intermittence of the wind pulls by assuming that the molecules of air, displacing each other, excite a vibratory motion which gives rise to little undulations following one after another at intervals of a few seconds. The resultant of a series of these undulations is a puff of wind which comes on suddenly and is followed by a short lull. A series of pulls constitutes a squall, and an aggregation of squalls forms the atmospheric wave which is called a gale of wind. We should naturally expect to observe the same phases in the formation of sea waves; and, in fact, if we carefully examine a wave, we shall find that it is covered with very fine ripples that correspond to the atmospheric vibrations. The ripples give rise to wavelets, which correspond to the undulations of the air, and are seen on the upper part of the waves. A number of waves constitute a billow; a series of billows give rise to a heavy sea; a series of heavy seas produces the great swell or tidal wave of the storm.

From the nautical point of view the ripples are of no importance, for they are seldom more than a few millimeters in diameter; but from the scientific point of view they may be considered as the origin of the swing of the liquid element, for they engender the wavelets. The last are still of no interest to the sailor, but are important in their relation to works of art, which are disintegrated by their blows apparently insignificant, but infinitely multiplied. The wavelets are from ten to thirty centimeters in diameter, and not very long. A very heavy wind breaks them up and contributes to the formation of a fine dust of salt water or salt spray, which is destructive to vegetation on exposed coasts. The wave proper may, in the English channel, be about ten feet high, thirty feet or more broad, and eighty feet long; its proportions do not disturb large ships, but it is destructive, in the long run, to port-works, and is dangerous to small craft when it breaks. We may estimate that ten waves make a billow. The first of the ten may be relatively small, but the others go on increasing to the last.—*Popular Science Monthly.*

Animal Remains in Coal.

Professor Miall, F. G. S., in a lecture on "Animals of the Coal Period," recently delivered at York, said that there were to be found associated with seams of coal, and especially with beds of shale even below coal seams, the flattened impressions of various creatures which once had life. There had been seen shells and other fossils, and the squeezed impressions of the bodies of crustaceans or insects. These remains, were, however, extremely fragmentary, and were as black as the shale in which they were imbedded; it was, therefore, a matter of considerable difficulty to put them together in order to find out their original shape or to what sort of animal they belonged. But during the last 100 years a number of naturalists had engaged themselves in this task and had brought to light a variety of results. Naturalists, indeed, believed that our common pond mussel was represented by an ally in that very remote period. It was found that the fresh-water animals of the coal period were very much more like recent animals than were the marine forms of the earlier times like those of the present day. Many of the common shells of Europe were represented in extremely remote antiquity. But marine shells and other productions of the sea were not mixed up with the beds, in which had been discovered land shells and the remains of land animals. All the marine productions kept, as it were, to themselves, and they were found in special beds or layers; but the marine beds seemed to mark the time when some low barrier which kept the sea at a distance was suddenly broken down, and the water of the ocean made an incursion upon either a fresh-water area or a land area, and left behind it some marine shells. Fossil centipedes, such as might now commonly be seen in our gardens and fields, had been discovered in coal measures. Scorpions, too, had been traced by their fossil remains, and thus proved to be closely akin to the scorpion of our own day. Cockroaches resembling in all essential features those with which most of us are familiar had been discovered in considerable numbers, and those of the present time formed perhaps one of the most ancient types of animal life now to be found upon our planet. Then there came the crayfish, which could be tolerably matched nowadays. But there had been animals which had disappeared from the earth altogether, without having left behind them any animal very similar to themselves.

PERMANENCE OF THE SEA LEVEL QUESTIONED.—In a paper in the bulletin of the Moscow Society of Naturalists, upon periodic oceanic oscillations, Trautschold attacks the problem of oceanic alterations of level and their relations to geological phenomena. His conclusions, based

upon a careful study of the past and present physiography of eastern and central Europe and western Asia, are to the effect that many of the phenomena of sedimentation and deposition attributed by geologists to a subsidence of the crust, are, in fact, due to periodic oscillations or upheavals of the oceanic surface, producing thereby inundations of the land masses, and that such is the nature of much of the newer sedimentations, *c. g.*, Jurassic of Russia. The position here maintained—a revival of the views of many of the older geologists, is anticipated by Prof. Edward Suess, who, in his "Antlitz der Erde" (Prague, 1883), clearly indicates the necessity of invoking the assistance of periodic oceanic fluctuations of level to account for the existence of much that has been heretofore attributed to terrestrial subsidence.

STONES PLACED IN PINE TREES BY BIRDS.—C. R. Oratt, of San Diego, contributes a note to science, as follows: About 65 miles south of the United States boundary, near San Diego, at an elevation of 6,000 feet, is a stretch of table-lands covered with large pines (*Pinus jeffreyi*), broken by many ridges of giant granite boulders, decomposing sufficiently to add materially to the soil. Broad, grassy meadows furnish food for cattle and deer. My father and myself, in riding through this forest in July, 1883, noticed several pines with the bark bored into at varying distances from the base of the tree to the branches; and in about one-third of the holes were the acorns of the here common *Quercus Emoryi*, very tightly fitted, the holes containing the acorns apparently newly made. The remaining holes were weather-beaten; and in them were equally tightly fitted bits of the granite gravel, of size corresponding with the acorns in the other holes. In the Guaymas mountains, of this county, a gentleman observed *Colaptes auratus* visit pines that contained similarly disposed acorns. The woodpecker tapped the acorns, breaking one now and then; the broken shells showing plain traces of having contained a worm, while the other acorns contained sound kernels. But what object could the birds have in substituting stones as shown above? Possibly they served as hiding places for many insects which would otherwise have secured places inaccessible to the birds.

ELECTRICITY IN RAILWAY RAILS.—A French journal gives an account of some curious experiments which were recently made in connection with the rails of the railway between Marseilles and Cognac, France, by a professor in the Faculty of Sciences in Marseilles. All the rails laid down for some time past have been transformed at both ends into powerful magnets capable of attracting even large pieces of iron. It was found that if the rails are removed they still retain their magnetic force for some time, losing it gradually. The magnetism is noticeable only after the fish plates are removed, and is accounted for by the friction produced by the wheels running over the line. On the whole, it is considered that the magnetic force exercises a beneficial influence by increasing the adhesion of the wheels to the rails.

THE COLOR OF INSECTS.—The relation of light to color in the evolution of species of insects has been discussed by G. Lewis, who is disposed to attribute the origin of the colors of insects to the sun's rays rather than to sexual selection. He supposes a process by which the various rays or wave movements from the sun impress living organisms with the structure necessary for color, and terms it "photoplasticity," basing his supposition on the alleged sufficiency of this mechanical theory of the action of light to explain the phenomena of color. After giving many instances from the Insecta, of protective coloration, he speaks of Lamarck, where the coloration is not protective, and states his belief that the latter are due to the sun's action.

EXPERIMENTAL AGRICULTURE IN CANADA.—The demands of progressive agriculture for a more substantial scientific basis are just now beginning to find definite expression in the Dominion of Canada. From the recent examination of experts before a special House committee at Ottawa, and from the general expressions of those who have a direct interest in the question, it is apparent that a keen sense of the utility of experiment stations is now developing a movement, which, it is to be hoped, will secure for the Dominion one or more much needed stations, founded upon the European idea of their utility from a scientific standpoint, and from that of the practical application of acquired results.

LIGHTING THE INTERIOR OF STEAM BOILERS.—A firm of boiler makers in England have arranged an electric light apparatus for lighting up the interior of steam boilers while they are under steam. It is said to work successfully, and there seems to be no good reason why such an apparatus would not be very useful. Certainly, valuable information regarding the influence of different methods of construction upon the very important subject of circulation might be obtained in this manner, which can not be had in any other way.

EXPLOSIVES.—The power developed by the explosion of a ton of dynamite is equal to 45,675 tons raised one foot, or 45,675 foot-tons. One ton of nitro-glycerine similarly exploded will exert a power of 65,452 foot-tons, and one ton of blasting gelatine similarly exploded, 71,050 foot-tons.



A. T. DEWEY. W. B. EWER.
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SAN FRANCISCO:

Saturday Morning, April 12, 1884.

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Standard Packing—Jenkins Bros., New York.
Engines and Boilers—Sturges Manufacturing Co., S. F.
Mattresses—California Furniture Manufacturing Co., S. F.
Powder—M. Ayers, S. F.
Employment Wanted—“J. S. R.” S. F.

See Advertising Columns.

Passing Events.

Mining news generally is without special interest just now. In this State the most active center is among the quartz miners in Nevada county, and in Sierra county. From Nevada little encouraging news is at hand. A great many miners are leaving the camps and towns for the Northern mines. There is scarcely a district that will not furnish its quota of those joining in the great rush. The transportation companies will reap a rich harvest no doubt. We give, in other columns, the latest news from the new mines. Another new placer region outside of the Cœur d'Alene is also announced, as will be seen by our mining summary.

Heavy rains during the week have caused inconvenience on our Southern California railroads, but it is not likely that the rainfall will keep on much longer, as we are rapidly approaching our dry season.

THE New York correspondent of the *Troy Times* says that one of the curious features in domestic architecture is the transportation of stone from that city to San Francisco for the palace which James C. Flood is constructing. This stone is quarried in Connecticut, and is then sent to Newark, where it is dressed, after which it is brought to New York and reshipped for its final destination. The ship *Alfred Watts* is now receiving 2,000 tons of this dressed stone, and other shipments will probably be required.

Traps for Inventors.

As soon as the United States Government grants an inventor a patent, and the Official Gazette of the Patent Office announces the fact, that inventor receives an alarming addition to his mail every day for a week. Advertisements, circulars and letters come to him from patent agents, patent vendors, patent institutes, humbugs, and all sorts of companies, firms and individuals. All of these letters and circulars express a warm interest in the invention in question, and a desire to benefit the inventor. They are all philanthropic in tone, and suppress any indication of desire for gain. It is for the inventor's good only that they write.

On closer investigation, it is found, however, that every one of these disinterested individuals needs some pecuniary acknowledgment before any business can be done with them. One man wants a \$5 or \$10 fee for advising the inventor what to do; another wants money to print circulars of the invention; another wants to exhibit the model in a room with other models, or wants to make a model; others want to negotiate for territory or sell rights, and so on. But every one needs more or less money in hand to do these things. The inventor who gets his first patent is dazed at all these offers, and sees so many tempting methods employed to make money that he is often deluded into parting with his coin without any very definite understanding of what he is to get in return.

All sorts of traps are set for unwary inventors. There is a class of men who prey on them. Inventors, as a class, are enthusiastic and sanguine. They believe their devices are of the greatest benefit and highest importance. Men who acknowledge and recognize this, and who praise their inventive genius, are apt to gain their confidence, and too often this confidence is abused.

Any respectable and reputable patent soliciting firm will advise its clients to be exceedingly careful of the persons with whom they transact business in patents or patent articles. There are so many frauds that it is difficult to segregate them from people in legitimate business.

There are all sorts of ways of getting money out of inventors. The latest which has come under our notice is the formation of a secret society, to be composed solely of inventors. There are not to be more than 250 members of the order. The initiation fee is to be \$25, and the monthly dues \$5. Members of such are to be assisted, and if they die their widows are to be supported. All this with 250 members, and \$5 per month. Some of the provisions are amusing. All new devices are to be submitted to a committee, which is to point out defects and indicate the cure. The order then sits as a body of examiners-in-chief, and passes on the merits of the invention.

It is not stated how a windmill man becomes an expert in steam engines, or a washing machine inventor is able to judge of the merits of harvesting machinery; but it is provided that the order will take out the patent through some special agency, probably to be indicated by the President, if he should happen to be connected with one, as will probably be the case. The patentee is then to assign a quarter interest to the society. There is to be a library, museum, etc.

The milk in the whole cocoanut, however, is to be found in this provision: “It is provided, in case an inventor is not able to join the order, and maintain his standing therein, he may, on the payment of a fee of \$15, place his invention in the hands of a member of the order, acting as his attorney, and who will be allowed to bring it before the order, when it will be subjected to the same ordeal as the invention of members, etc.” With this provision a dozen or two men may run such an “order” with great facility.

It is not at all probable that such a scheme will attract many inventors, but it is possible some may be thoughtless enough to lend their names without due consideration. No man should assign any interest in his patent to unknown parties and without some distinct understanding about it. He should not accept the weak statement of interested parties without thoroughly investigating their antecedents and business standing. And before he pays out any money, let him find out who his associates are to be and how many of them there are. Elevation and advancement of inventors is all very well, but as a general proposition they can advance themselves better than other people can do it. No man should go blindfold and thoughtless into any scheme of a doubtful utility on the mere representation of men he does not know. It is pretty well understood that it takes personal efforts of a very energetic character to sell patent rights, and the mere exhibitions of models and drawings or assignments to agents does not always accomplish the object.

Foundry Notes.

The Risdon Iron Works

While the Risdon Iron Works has on hand no very large contracts, there is considerable work in the shops. Among other things they have in course of construction six of the Heine boilers, a type which they are introducing here very rapidly. Among them in one for the Parson's Flour Mills, one for the Capital Flour Mills, Los Angeles, and one for the Stockton Water Works. They are making also a compound condensing engine for a new stern-wheel steamer for the Spreckels sugar refinery. The boat has just been completed at Turner's ship yard, Benicia. She is intended for carrying sugar, and will run from the refinery, at South San Francisco, to the city front wharves.

Among the specialties now being introduced by the Risdon works is the Coleman compound engine, of which several are now in course of construction. One of these is going to a saw mill. There are two for flour mills, one going to the Capitol mills, Los Angeles, and the other for Parsons. There is also a compound mill engine for the Tajo mine, Mexico, and a compound pumping engine for the Stockton water works.

Two large steel boilers for the steamer *Ancon* are nearly completed. They have three furnaces. They will be put in with fore and aft supports, and not as usually arranged. It is thought that in this way the weight will be more equally distributed and the bottom of the boiler will be more accessible.

They are sending a large ice-machine to Sydney. It is a 40-ton machine for the Beath process. An English gentleman who had investigated ice machines in many parts of the world examined the one of the style at work in this city and ordered the machine now being made. The works are also putting one of the Bell-Coleman refrigerators into one of our Pacific coast ocean steamers. It is intended to preserve milk, provisions, meats, etc., and no live stock will have to be carried on deck. It will be possible also to carry on this vessel in the refrigerators, game, meat, fish, etc., for sale in the markets at her destination. The whole apparatus is being put into the steamer on contract.

At these works they have just fitted up a special shop with suitable tools for manufacturing the McBeth pulley, which we recently illustrated in the MINING AND SCIENTIFIC PRESS. They are now being made in quantities and furnished to the trade. A 42-inch pulley of this make is now driving the machine shop at the works. The pulley it displaced weighed over twice as much as the new one.

Among other things being made in the shop is a charcoal grinder for the Giant Powder Company. There is also a large double-effect sugar machine for the Sandwich Islands. They are at work on some very heavy water pipe, made of one-fourth inch wrought iron, for the Spring Valley Water Company.

Among other things of special interest may be mentioned the machinery now being made for propelling cars by compressed air. The air compressor and reservoir are completed, and a trial will shortly be made on the Howard street line. By the system proposed the cars will take in a fresh supply of compressed air at every stoppage for passengers, pipes running the whole length of the line for conveying the air from the reservoirs.

The Risdon Works are sole agents on this coast for the Wilson Gas producer. It may be applied to factories or other places where fuel is burnt for raising steam or other purposes.

Technical Society of the Pacific Coast.

An adjourned meeting of this new Society was held in the Patent rooms of the Mechanics' Institute, on Saturday evening last, Mr. George I. Specht in the chair. The report of the committee on revision of the constitution was read by Major Jones. An entirely revised constitution was submitted, the amendments and changes decided on at the previous meeting having been incorporated therein. After some slight discussion the constitution, as read, was adopted. An agreement to organize was signed by those present desiring to become charter members, and it was left open for signatures until Saturday, the 12th inst, at 8 p. m.

Mr. Manson thought that instead of electing officers a nominating committee should first be

appointed. The idea did not prevail however.

A motion was carried to appoint a committee of five to draw up suitable by-laws and present them at the next meeting. The chairman appointed Messrs. Parry, Gutzkow, Molera, Bridges and Wagoner.

There was an attendance of upwards of 70 gentlemen at the meeting, and great interest was manifested. Already 95 charter members have been enrolled. This Saturday evening, after the adoption of the by-laws, the officers for the ensuing year will probably be elected. The new society will start under very favorable auspices indeed.

Prizes for Mining Essays.

Among the methods adopted in European countries for the dissemination of information about mines, and the encouragement of students of mining, is that of offering prizes for essays on subjects connected with the industry. Sometimes the prizes are offered by technical institutes or mining institutes, and sometimes by individuals. This is an idea worthy of imitation in this country. It would be greatly to the advantage of the mining population if any corporate body, association of individuals, should offer substantial sums for essays on practical matters of mining. An example in point is that of a gentleman in England, who offered three prizes for essays on the following subject: “Practical suggestions for guarding against such accidents as are still commonly met with in coal mines especially with reference to the part that workmen and officials may themselves take in guarding against such.” Sixty persons intimated their intention of competing, and thirty of these sent in their essays.

The competition was open to any one working in or about coal mines in the county of Durham, within the South Durham mines inspection district, not above the grade of an overman, and who has not served an apprenticeship with a mining engineer, and who, having been for three years or more employed underground, has also been, for at least three months, a member of a colliery institute or of a science class, or other like institution. Two months' time was given to prepare the essays. In a separate sealed envelope was given the real name of the writer of the essay, his occupation, name of colliery, name of institute of which he was a member, etc. The sealed envelope was not opened until after the examiners had given their decisions on the papers, which were, by the way, signed with *noms de plume*. The length of the essay was not to exceed six pages of foolscap, written on one side, and to be the honest production of the writers.

The information gained in this way is of a very practical character, being the results of the every-day experience of practical men.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday evening. Dr. H. W. Harkness, Vice-President, presiding. The name of Edward Probert, M. A., a graduate of Cambridge, was proposed for membership. The librarian announced several valuable contributions.

Rev. E. S. Greene gave an account of a trip which he recently made in San Luis Obispo and Monterey counties. He found at Paso de Robles a comparatively new botanical territory. During the trip he discovered three new species of flora. In the middle of San Luis Obispo county he discovered a new species of gooseberry, wholly new to science. Near Soledad he came upon a new species of olive tree peculiar to California. These results indicated how much of our botanic wealth was yet to be learned.

The Chairman stated that he had received from J. M. Hutchins specimens of oak galls from the Yosemite Valley, exhibiting the work of the insect, which is one of the *cynips*.

A letter was read from William Carter, of North Vallejo, who lost last year seventy-five acres of barley by the ravages of the Hessian fly, and would probably lose 500 acres of wheat this year in the same way. Accompanying the letter were several specimens of the egg, grub, and pupa, taken from his wheat field. The eggs were one-fifteenth of an inch in length, and one two-hundredth of an inch in breadth. They would probably hatch out in a few days. Dr. Harkness had some of the specimens prepared for exhibition under the microscope.

Dakota Territory.

Placer and Quartz Mining Districts of Pennington County.

Pennington county lies in the southwestern portion of Dakota Territory, and is bounded on the south by Custer county, east by the South Fork of the Cheyenne river, north by Lawrence county, and west by Wyoming Territory. The principal creeks flowing into the Cheyenne are the Rapid, Spring and Battle creeks.

The western half of the county is mountainous and rough, but rich in precious and other minerals. Some of the most valuable placer mines of Dakota are situated along the foothills of the belt. The ore is low grade, but free milling and abundant, and the facility and cheapness of its extraction and treatment render these mines valuable and guarantee a prosperous future for this district, the country being well watered and timbered. W. H. N. Maguire, editor of the *Pick and PLOW*, of Rapid City, gives the following description: "The last year there were probably 200 miners engaged in placer mining, in the summer months—working under great disadvantages—and the average per capita could not have been less than \$750, making the total yield \$150,000. But it must be borne in mind that all this mining work was of the most primitive kind—wheeling gravel a long distance from the higher bars to the creeks to wash. For this reason no adequate idea of the extent and richness of the placer deposits of the Black Hills can be formed from what they have actually yielded to date. The deposits are of immense extent, embracing many thousands of acres, the gravel in places being over fifty feet in depth, carrying some gold from the top down. It is believed a thousand miners will be employed for many years working the placers of Rapid and Castle creeks, beginning with the completion of the flumes and ditches that will bring water over all the bars at a sufficient elevation for hydraulic mining. Aside from the vast bars of auriferous gravel lying immediately along the banks of Rapid and Castle creeks, embracing many thousands of acres, the 'Red Bed' or foothill placers embrace a 'wash' extending in a northerly and southerly direction from Elk creek to Spring creek, a distance of from 15 to 18 miles, and having an average width of 2 miles. Good gold prospects are found at all points in this immense belt of washed gravel; the poorest would rank with the best present hydraulic diggings in California, and good 'dumps' abound. All this ground will eventually be covered by the Upper Rapid Creek water rights of the Estrella Del Norte Mining Company."

Rapid creek (the Castle, its principal tributary, being the main and central current of the Black Hills) is the only source of supply for water for the placers of Pennington county; but its volume is never less than 3,000 miners' inches in the driest season. Every inch of it, from the head of the Castle to the debouchure of the main current from the eastern foothills, has been appropriated, and within the next three years will be actually utilized by the Estrella del Norte Company—one of the strongest organizations of Eastern mining capitalists—when the gold yield of the Black Hills will be immensely increased, and American placer gold mining will probably assume something like the importance it held in former years. There are in Pennington county many very promising gold veins, some of vast extent, but they have not yet been developed to a produc-

ing condition. The gold yield from them will undoubtedly be very great in the near future. Responsible companies have been organized for the development of some of these veins. At the head of Castle creek, in Pennington county, are found vast bodies of copper ores, the result of 44 assays of ore from the Wall Street and Equator mines showing an average of 31.7 per cent copper. These ores are generally in carbonates, and smelt very readily without the introduction of foreign fluxing material.

Rockerville Placer Mining District

Is situated 15 miles southwest from Rapid City, in Pennington county. It is on the eastern edge of the slate formation, and adjoining the limestone which encircles the hills. Some of the gulches have cut through the limestone and worked into that formation. It is on high table-land, lying about 200 feet higher than Spring creek, which runs through a deep canyon about a mile north. Mr. Fred J. Cross says of this district: "There is no stream of water running through the district, though there are a few small springs on Rocker gulch, which, by damming, furnishes a little water, and in wet seasons, with the surface water, will furnish sufficient for sluicing part of the time. The water for working to any extent has to be brought by ditches and flumes. The past sea-

Mitchell bar, where it was used quite successfully the past season for hydraulic purposes, and washed off a large part of this bar. They also extended their bedrock flume for quite a distance below Harney, and constructed two miles of flume to be used for hydraulic work in connection with the bedrock flume. These flumes were little used during the past season, as the company directed their attention to the work on and above Mitchell bar. After the close of the placer working season, quite extensive prospecting work was started in the bed of Battle creek, between Mitchell bar and Harney. A shaft was sunk, and bedrock struck at depth of 30 feet. From the bottom of the shaft drifts were opened both ways, crossing the bed, one of which penetrated about 15 feet, the other not so far, getting fair prospects. Cold weather coming on, work was suspended for the winter. Water was encountered in the gravel and on the bedrock, and necessitated the use of large steam pumps, delaying the work as well as making it quite expensive. On completion of the prospect, it is announced that the company, if they find pay sufficient to warrant it, will put in a bedrock drain or complete their bedrock flumes. For the first time bedrock has been touched on the creek, in the upper part of the district.

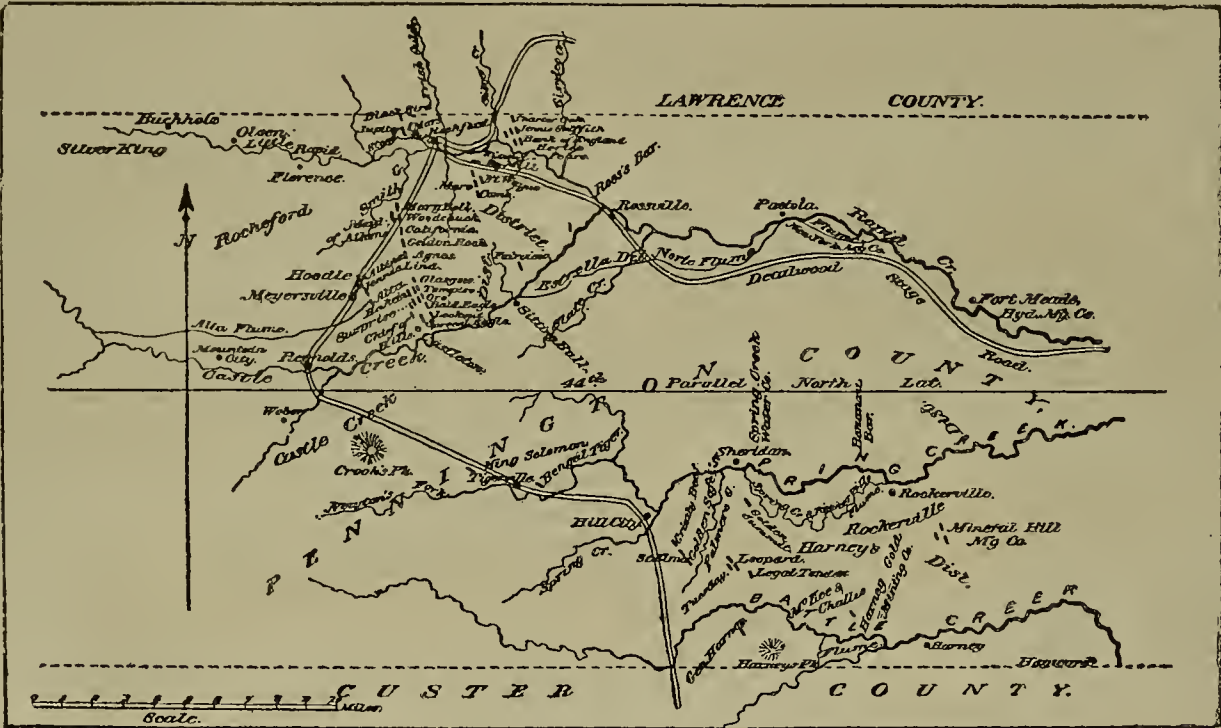
In the Cross Quartz Mining District,

Atmospheric Pressure and Underground Work.

The influence of sudden variation of atmospheric pressure or outbursts of fire damp in coal mines, is a subject which has been discussed without any very definite result being arrived at. The majority however, seem to think that this influence is great; and in England, regulations have been made to protect the underground workers in fiery mines from the evil consequences of this capricious influence, and governmental authority compels observance of the rules. During a heavy fall of the barometer, ventilation is quickened, and some persons advise a stoppage of blasting at such times. Experiments made a few months ago by a Belgian engineer showed that an effect of high winds was to diminish the action of fans in a very appreciable degree. Since these winds occur with a low barometer, the ventilation of the underground workings may be lessened at a time when it should be augmented; or a slightly increased velocity of the fan intended to give the requisite augmentation may be neutralized by the action of the wind. This is a fact demanding careful attention, and deserves to be generally known.

An arrangement of barometers and fans at a

Belgian colliery, where they believe there is danger at periods of low barometer, has been noted by Mr. Andre, the well known mining engineer. The ventilation is there effected by means of a large Guibal fan driven by a horizontal engine, the cut-off in which is controlled by a mercury barometrical regulator. With this arrangement a decrease of the atmospheric pressure—in other words a fall of the barometer—automatically increases the admission of steam to the cylinders; while an increase of pressure, indicated by a rise of the barometer, diminishes the inlet in a corresponding degree. Warning of the change



PLACER AND QUARTZ MINING DISTRICTS OF PENNINGTON COUNTY, DAKOTA.

son was very favorable for mining. There was water enough, and in some places miners were driven out of deep diggings by it. The Black Hills Gold Placer Mining Company completed, in 1881, a good, substantial flume, about 16 miles in length, which takes the water out of Spring creek and conveys it into the district at a height sufficient to allow it to be distributed to all parts, no gulch or bar lying so high but that the water from this flume can be carried to it. In 1881 a company was formed, called the Rockerville Bedrock Flume Company, which secured the right of way through all claims on Rocker gulch for the construction of their flume, and secured also some good claims on the gulch. But little attention is paid to quartz mining in Rockerville district, though development work is being quietly done on a few locations."

As yet no bullion of any consequence has been taken out, but, with the erection of mills, this part of the hills is destined, at no distant day, to become one of the gold producing sections of the country.

Harney District.

This district is situated on Battle creek, about eight miles southwesterly from Rockerville. Placer mining has been carried on from the first settlement of the country, but no work of any magnitude was commenced until within a year, when the Harney Gold Mining Company was organized, which secured all the old claims for a long distance on the creek, as well as a number of high bar claims. They built in the past year about six miles of flume, bringing the water of Grizzly Gulch and Battle creek on to

Quartz mining did not in the past year command much attention, the miners being attracted from the precious metals to mining mica, the deposits of which in this district are quite extensive. A number of companies are engaged taking out mica, and many miners have suspended prospecting on their own account for gold and silver, to work for wages, or to prospect for mines of mica on their own account. A few have kept steadily at work successfully prospecting for or developing locations. Among these are Vieregg, Engle & Co., doing business under the name of the Grand Island Company. The district is crossed from northwest to southeast by a belt of quartz veins nearly a mile in width, many of which show good ore, although little work above the annual assessments, and in many locations not that much, has been done upon them.

Rockford Mining District.

This district is partly in Pennington and a portion in Lawrence county, and contains some valuable mines. It has a greater area than any other district in Pennington county, and a larger number of quartz mines. The mountain range of the Black Hills between Custer and Harney's Peak, the highest elevations in the hills, runs through the district. On the two principal streams flowing through the district, Castle and Rapid creeks, placer mining is still carried on to some extent by private individuals, who took from these placers in 1882 but little more than \$5,000. Larger returns will be reached as soon as men of capital can be induced to invest in these mines and employ hydraulic machinery.

having taken place is given by the ringing of an electrical bell. The apparatus used is very simple, and it is said to be thoroughly efficient in its action and reliable under all conditions.

Mechanical ventilation is fast displacing the furnace everywhere on the Continent, but more rapidly in France and Belgium than in Germany. In Belgium especially any alterations required to be made in the ventilative service furnish an occasion at once seized upon for the substitution of the fan for the older method. Very little novelty is to be seen in the design of fans, the Guibal or the Letetot being employed in almost every instance. But the greatest care is observed in their erection, and the teachings of experience are followed in all the details of their construction. Attention to these minor matters has led to an increase in the efficiency of these machines as well as their durability. The Continental practice of enclosing these structures under specially-erected buildings is also one that might be adopted with advantage elsewhere.

On and after the 15th instant the Central Pacific will run a fast mail train from Ogden, covering the distance between Ogden and San Francisco in thirty-nine hours. This will complete the fast mail service between New York and San Francisco and save twenty-four hours.

The House Committee on Public Lands has adopted Henley's report recommending the forfeiture of the unearned portion of the Northern Pacific land grant.

Principal Localities of Nickel Ore in America.

Chatham, Connecticut.

The locality at Chatham, Connecticut, about six miles from Middletown, yields both nickel and cobalt in combination with arsenic and sulphur. The ore occurs in mica slate. It is not now worked, but it was one of the first places explored for metals in New England. As early as the year 1661 the inhabitants of Middletown made a grant to "our much-honored governor, Mr. John Winthrop, for the discovery of mines and minerals and for the setting up of such works as shall be useful for the improvement of them." It is probable that the governor hoped to find silver, being misled by the white, shining ore. Neither nickel or cobalt had been discovered. About one hundred years later, in 1762, Dr. John Sebastian Stephany, a German, reopened the old works, and, in 1770, associated John Knoll and Gominus Eskelens with him, and worked the mine for cobalt. In 1781, January 1, President Stiles of Yale College wrote in his diary that Mr. Eskelens had visited him "full of his cobalt mine and China voyage. He some years ago bought the Governor's Ring, as it is called, or a mountain in the northwest corner of East Haddam, comprehending about 800 acres, or about a square mile area. Here he finds plenty of cobalt, which he manufactures into smalt, with which is made the beautiful blue of chinaware." Some twenty tons of cobalt ore appear to have been shipped to China from this locality. Nothing more appears to have been done for thirty years. In 1818 Mr. Seth Hunt, of New Hampshire, worked the mine for three years, and expended about \$20,000. The ore was taken to Glazenbury and stamped by hand. He obtained, as he supposed, about 1,000 pounds of cobalt and shipped it to England, where it was found to be nickel, containing only a low percentage of cobalt. The difficulty in separating the nickel from the cobalt caused him to abandon the property. The mine was again reopened by Professor Charles U. Shepard in 1844, but with no greater success.

In 1853 an attempt was made to work the mine on a larger scale than before, and a company known as the "Chatham Cobalt Mining Company" was organized for the purpose. The assays made at the time upon the dressed ores show that they contained about 18 per cent. of nickel and cobalt, in nearly equal quantity, or 9 per cent. of each. The firm of William Coffin & Co., then operating in nickel at Camden, near Philadelphia, offered to take all the ore that could be produced, up to 200 tons annually, of that grade, and pay \$200 per ton (of 2,240 pounds) for it on the wharf at Philadelphia. Cobalt at that time was worth 14 shillings sterling per pound, and nickel \$1.70 per pound. According to a report by Mr. Simonin it appears that the average metallic contents of the ore as mined, before dressing, was 2.2 per cent. The property was examined and reported upon in 1855 by Prof. Jas. C. Booth, of the United States Mint, who found that the ore crushed and washed in a Bradford's ore separator yielded a product averaging about 20 per cent. of the oxides of nickel and cobalt in nearly equal parts. This company made a good display of the ores and products at the International Exhibition, New York, 1853. The second annual report of the company, by Dr. Francfort, the manager, though very complete as regards the amount of machinery and facilities for working brought together during the eighteen months after the organization, is silent as regards the production, which it may be assumed was comparatively insignificant. The enterprise was soon after abandoned. It is believed that a small quantity of nickel from this source reached the Mint.

Other Localities in Connecticut.

There are small quantities of nickel at other places in the ancient schists of Connecticut. The principle localities, however are at Torrington, where nickel ore was once mined on a considerable scale, most of it being sent to England, but the undertaking was an unprofitable one, and was not long continued. The Litchfield nickel mine is about 10 miles further south, and yielded ore similar to those obtained at Lancaster Gap, in Pennsylvania. Neither of these localities have been worked for many years. The mines are full of water, and an old furnace formerly used for smelting the ore is in ruins.

Orford, Quebec.

The sulphuret of nickel (millerite) is found in the township of Orford, Province of Quebec, Canada, and has been described by Professor Hunt, and later by Mr. W. E. C. Eastis, of Boston. It is disseminated through a mixture of green chrome garnet with calcspar and through the adjacent rock. The ore is very lean; 508 pounds run through the small blast furnace at the Massachusetts Institute of Technology gave 8 pounds of matter, or alloy, containing 71.84 per cent. iron and 22.70 per cent. of nickel.

Thunder Bay.

Mr. W. M. Courtis has directed attention to a nickel ore containing 4.50 per cent. of the metal, with some cobalt, from Silver Harbor, on the west side of Thunder bay, on the north shore of Lake Superior, and at other places inland. The ore of Thunder bay is niccolite associated with native silver, and occurs in a vein traversing Huronian talcose slates. Another locality on Heron bay affords an ore con-

taining silver and gold and 9 or 10 per cent. of cobalt and nickel.

Wallace Mine.

Nickel ore occurs also on the north shore of Lake Huron, in Canada West, at the Wallace mine. Sir William Logan, the director of the geological survey of Canada in 1863 describes this ore as a fine steel-gray mixture, whose analysis, after deducting earthy matters derived from the gangue, gave in 100 parts: Iron, 41.79; nickel, 13.93; arsenic, 6.02; sulphur, 38.16; copper, 0.10. Another sample specimen gave 8.26 per cent. of nickel. The nickel contains about three parts in a thousand of cobalt. This Wallace mine was originally opened and worked as a copper mine in the years 1848 and 1849. About three easks of nickel ore were taken out and shipped to a gentleman in New York, who had it smelted and a part of the product worked up into dish-covers, and sold the remainder for making nickel silver. The ore occurs in quartzose and chloritic schists. A specimen analyzed by Messrs. Partz and Buck yielded 6.80 per cent. of nickel. A company was formed to work this property, but it did not succeed.

Mine la Motte, Missouri.

In Missouri the ancient Mine la Motte has furnished considerable ore, from which nickel is obtained in the form of matte, which is generally exported. Some of the earlier supplies of nickel at the Mint for the small nickel bronze coins were obtained from this source.

California.

Nickel ore occurs associated with chromite in Kern county, in this State, but this locality has hitherto furnished only samples.

Oregon.

A new deposit of nickel ore has recently been brought to notice, and is extremely interesting, inasmuch as the ore closely resembles the ores from New Caledonia. It is essentially a hydrated silicate of nickel oxide and contains from 20 to 30 per cent. of nickel oxide (in selected samples) and an average, perhaps, of 10 per cent., though the locality has not yet been sufficiently worked to determine satisfactorily what the ore will average in large quantities. The locality is in southern Oregon, in Douglas county, at Piney mountain, about eight miles from Canyonville. It was discovered in 1881. It is described as corresponding exactly in its association and mode of occurrence with the description given by Professor Liverridge, of the New Caledonia ores. These are found in serpentine with chromite and steatite. In Oregon the ore is found in bunches and pocket-like accumulations in serpentine with chromite. Analyses have been made by Dr. Hood, who gives his results in comparison with the New Caledonia nickel ores as follows:

ANALYSES OF OREGON NICKEL ORES, COMPARED WITH THOSE OF NEW CALEDONIA.

	Oregon ore, A.	Oregon ore, B.	Garnierite.	Nomineite.
Silica.....	48.21	40.55	47.23	47.90
Iron & aluminum oxide.....	1.38	1.33	1.66	3.00
Nickel oxide.....	23.88	29.06	24.01	24.00
Magnesia.....	19.90	21.70	21.08	12.51
Water.....	6.63	7.63	5.20	12.73
	100.00	100.24	99.82	100.14

There is not properly any mineralogical distinction between garnierite and nomineite. The ore is mainly a mechanical mixture or "infiltration, penetrating and charging absorbent magnesian rock with greater or less amounts of nickel. The composition is not constant. The color varies from rich dark green to a pale whitish green, according to the amount of oxide of nickel absorbed. It is by some authorities referred to the old species pimelite, but it appears to contain more silica and less water than that species.

Nevada.

Dr. T. Sterry Hunt also cites a nickel ore from western Nevada, describing it from a sample submitted to him in 1876 as a greenish translucent, amorphous mineral with black stains, resembling chrysocolla in appearance. Analyses at the Massachusetts Institute of Technology, gave oxide of nickel 3.23 per cent and oxide of cobalt 3.88 per cent. This is probably the same kind of ore, and from the same locality, near Columbus, which yielded some ten tons, but much richer in nickel than the sample analyzed, shipped from San Francisco to Swansea in 1882.

Colorado.

Mr. F. F. Chisolm reports that nickel in small quantities, with its associated metal, cobalt, is found in many veins throughout the Rocky mountains; but hitherto mining for nickel exclusively has not been prosecuted, except at the Gem mine in Grape Creek canyon, Fremont county, Colorado. Here the metal occurs quite abundantly, and is associated with silver. Some tons of ore were mined and shipped to New Jersey for reduction, but the trial apparently was not successful, as work on the mine has been discontinued. Nickel occurs in the ore from some mines at Leadville, in small quantities.

British Columbia.

Dr. James Blake has noted the occurrence of nickeliferous sand on Fraser river, British Columbia.

Lancaster Gap, Pennsylvania.

But of all the localities cited, the only one

which has exerted an important influence on the development of the metallurgy of nickel in the United States is that of Lancaster Gap, in Lancaster county, Pennsylvania. Mr. Joseph Wharton, of Philadelphia, leased the mine January 1, 1863, and finally purchased it May 6, 1867. He is now the only producer of metallic nickel in the United States.

The ore of Lancaster Gap is the nickeliferous pyrrhotite, containing in bulk from 75 to 2 per cent of nickel. It is enriched at the mine by smelting into a matte containing 10 per cent or more of the metal, and in this condition the nickel is taken to Camden, New Jersey, opposite Philadelphia, for extraction. There is associated with the pyrrhotite the mineral species millerite, in crusts and layers formed of a close aggregation of the slender crystals which give a velvet-like surface to the crusts when formed in cavities. Specimens several inches broad are frequently found, and from one-eighth to one-quarter of an inch in thickness.

Nickel ore from this mine was treated as early as 1850, though the mine had been previously worked for copper. Works for the extraction of nickel from the Lancaster and other ores were first started in Philadelphia, and in 1853 Messrs. F. M. Buck, E. W. Coffin, and others erected nickel works at Camden, supplying them with ore from the Gap mine. These were the same persons who proposed to work the Chatham ores. Mr. Wharton leased the Camden works May 13, 1863, and purchased them January 19, 1869. They were then greatly enlarged and extended.

A large portion of the metal produced at these works by Mr. Wharton has been used at the United States Mint for the subsidiary small coins, and a considerable amount has been exported. Since the development of nickeling by galvanism a large part of the product has been put into the form of nickel salts and anodes.

The Oil Fields in California.

Writing to the *Pittsburgh Dispatch* from Newhall, Mr. J. W. McKinley gives the following account of the oil fields of that region:

On the edge of the town is located the refinery of the company, connected by pipe lines with the wells, a few miles distant. Leaving Newhall, we drove to Pico canyon, the principal producing territory of the region. As we approached, we saw away up on the peaks the tall derricks in places which looked inaccessible; but no spot is out of reach of American enterprise and perseverance. In one of the wildest spots of the canyon, about thirty men were making the mountains echo to the strokes of their hammers upon the iron plates of a new 20,000-barrel tank. Along the canyon are scattered the houses of the employees of the company, most of whom have recently come from Pennsylvania. Near one of the houses was a graded and leveled croquet ground, with a little oil tank on a post for lighting it at night. Farther up we came to a cluster of producing wells, with others at a little distance on the sides of the mountains, or even at the top, hundreds of feet above our heads.

The first well was put down about eight years ago, but more has been accomplished in the last two years than in all the time previous. One well which we visited has produced 130,000 barrels in the last three years, and is still yielding. There have been no very large wells, the best being 250 per day, and the average being about ninety barrels; but they keep up their production with scarcely any diminution from year to year. Drilling has been found difficult, as a great portion of the rock is broken shale lying obliquely. The tools slip to one side very easily, and a number of "crooked holes" have resulted. One driller who lost his tools altogether in a well, and finished it with new ones. The cost of putting down a well is from \$5,000 to \$7,000, depending upon depth, etc. Most of the wells are from 1,200 to 1,500 feet, but some have yielded at a much less depth. One well of 270 feet depth produced 40 barrels per day for about three years, has been deepened, and is now yielding even more. Another one of 800 feet is said to have produced 200,000 barrels in the last five or six years. Drilling has been very successful in striking oil in paying quantities wherever there were indications of its presence.

The Pacific Oil Company now has 27 wells producing or drilling, and during the last two years has been rapidly widening the scope of its operations. It has now from 30 to 40 miles of pipe lines, and is preparing to lay 20 miles more, to connect its land with ocean shipping at Ventura. The producers of California have a great advantage in their proximity to the ocean, which gives them free commerce with the outside world. Crude oil is now sold at \$3 per barrel in Los Angeles, and the oil companies are making immense profits. There is a very large amount of oil territory as yet undeveloped, and a rich reward awaits enterprise in these regions.

In the Camulos district, which lies west of the San Fernando, are even stronger surface indications of oil than there were in the Pico canyon. We first went up the Brea canyon, in which are numerous outbursts and springs of oil. Ascending the mountain west of this canyon, we could plainly see the break in the mountains crossing from the San Fernando through this district to those beyond which have been developed. A couple of miles farther west, the Hooper canyon stretches back

over two miles into the mountain, and is full of oil. Great pools of oil fill its water-courses that are dry at present. Hundreds of barrels of oil must be wasted away and evaporated during a year. A well put down only 90 feet by horse power struck light oil in considerable quantity, and, had it not been for the death of one of the owners and the consequent suspension of operations, would doubtless have yielded in large quantities at the depth of a few hundred feet.

The mountainous territory between these two canyons will probably in a few years be the scene of great activity. In the Little Sepe district, a few miles west of Camulos, a 125-barrel well was struck at 1,500 feet recently. The Santa Paula region, a little farther west, is also yielding large profits to the parties developing it.

Difficulties of Mining on the Comstock.

Superintendent W. H. Patton, who has the distinction of having mined out more gold and silver than any other man that ever lived, recently gave the *Reno Gazette* some interesting information about mining on the Comstock. He says a foot of timber was put into the bonanza for every dollar taken out. They paid \$120,000,000 and into the hole left was packed 120,000,000 feet of timber worth 2 cents a foot. The timbers were laid in rather loosely and occupied about two-thirds of all the space, the one-third being divided up into thousands of cracks and openings in the corduroy, as it is called. The top earth keeps caving in and compresses all this work into one solid mass and finally the cave reaches the outer crust and the surface settles. By this process 12-inch timbers are crushed to seven, or nearly half their size. In these dark and distant caverns the wood decays and forms gases which are frequently heard exploding. The wood is set on fire and year after year it smoulders and smokes in a slow but terrible way. There are many places in the mines where the smoke works its way out and can be plainly smelled in the air. The largest body of territory that has been worked out and closed up is in the old bonanza mines, and extends from the 1,200 to the 1,950 levels, and is 1,300 feet long. It was worked out from 10 to 200 feet wide, and filled with timbers. There are many places in it now on fire, and it will smoulder for centuries unless it gets a draft of air somewhere, when it would break out into a terrible blaze. The gas generated in this way is of the deadliest character. It is confined by air-tight bulkheads 60 feet thick of solid timbers. Where the air has a downcast this is more necessary than the up-cast shafts, which carry the gas out into the air instead of down where the men are at work.

There are three separate currents in the system of ventilation in the mines of the Bonanza Company. One is down the C. & C. shaft to the bottom of the 2,900 level and up the Bonner shaft. It carries 16,000 feet of air a minute. The second is down the Ophir shaft and up Con. Virginia. It goes to the 3,100 level, carrying 20,000 feet a minute. The third is down the Union and up the old Sierra Nevada shaft. It reaches 2,900 feet and carries 12,000 feet a minute. This air goes down fresh and dry. At the bottom it gets heated up to 100° or over, which increases its capacity for absorbing moisture. It comes out steaming from the mouth of the shaft, and thus carries out of the mines 16,000 gallons of water a day, equal to a stream of 1 miners inch of water. Mr. Patton thinks the heat is caused by chemical action. There is some lime in the rock and it would create heat when dissolved in water. Many think that feldspar makes heat when it decomposes to form kaoline. The mines are no hotter at 3,100 feet than at 1,500 except when a vein of hot water is tapped. That makes it seem hotter than it really is by heating up the air and at the same time increasing its moisture. Moist air at 110 deg. is hard to endure than dry air at 120 deg. Mr. Patton keeps a record of the water raised and he says it does not increase with depth. They have struck no new water at all, but drain all the levels above. No supply of water from the surface reaches them. They feel neither wet seasons nor dry at such depths. Mr. Patton says that there is no reason to be discouraged at the prospect for the Comstock. The ledge is perfectly defined and of as favorable formation for ore as it ever was. There are many streaks of good ore through it, and any day a bonanza might be struck. He says he can handle rock as cheaply at the 3,100 with the machines now there as he could on the 1,500 with what they had then. If there is a body of \$50 ore 20 to 50 feet thick and he can find it he will be able to hoist and mill it for \$20 a ton, which will make Virginia City shine again.

BESIDES the Paradise Valley Company, which is now paying dividends regularly, several others are at work in the Paradise mines. Nick Frayer reports that he has found good ore in the Live Yankee, and Braunan and Marcott are taking out rich ore in the Rattler. The success of the Paradise Company under Superintendent McCurdy's management will, it is believed, induce other companies who own mines in the vicinity to resume operations this summer, with the view of developing them.—*Silver State*.

It appears that too many miners are crowding in at Coryville. The Hawthorne papers say it is useless for more men to come there in search of work.

Rusting Reduction Works in Arizona.

The *Quinto Prospect* says: The question naturally arises, "How is it that so many fine mills and smelters are going to ruin in a country that is constantly calling for more reduction facilities? To the new arrival it seems a marvel, but it is no mystery to one who has resided for some years in Arizona, and watched the manner in which mining schemes have been gotten up. That there is any lack of mineral in this country none, we suppose, will venture to assert. Nor that reduction works, when erected as a sound business proposition, fail to pay well. Witness the 'Clip mill in Silver district, which is paying \$1,000 a day, the Esperanza mill at Oro Blanco, the Jessie Benton mill at Owl Heads, the Silver King mill, which has paid over a million dollars in dividends, not to mention the Tombstone mills, and many others.

These properties are not blazoned forth every week in the papers. They and many others work quietly along accumulating wealth for their fortunate owners, who work them at home, not on the New York or San Francisco stock boards. Many mines also, which are seldom heard of are being profitably worked on an economical plan, without an expensive office and board of mismanagers.

Now, as to the other manner of operating. A party of eastern capitalists hear of our wonderful mineral resources and commission an "expert" to find them a good opening for their superfluous cash. Mr. Expert arrives here, and you will suppose, goes to work to find a valuable property. Oh no! that is not what he is after. He hunts up some poor devil of a prospector, whose shirt hangs out of his breeches, and who has half a dozen more or less worthless locations, which he would be delighted to sell for \$500. Says Mr. Expert: "You give me a bond on these properties for \$50,000 and when the sale is made I will pay you \$5,000." Needless to say the offer is accepted. The sale is made. The miner gets his \$5,000, of which he will have perhaps five dollars left in three months, the "expert" pockets \$45,000, and a handsome fee. A company is incorporated with well-salaried officials and handsomely furnished office. A young nephew of one of the owners, who has been clerking in a New York law office, and don't know the difference between a winze and a windmill, is sent out as a superintendent, at \$300 a month. The first thing to be done is to develop the mines? Not a bit of it. To build a mill, of course. So up goes a fine twenty-stamp mill. Then about a fortnight before it is ready for work, they commence to look over their claims for ore, and find they haven't got any. Mill shuts down—if it ever started. Super goes back to Gotham and tells about Apaches and native silver; there is one more monument to the folly of eastern capitalists, and one more nail in Arizona's coffin.

That this description is not exaggerated, few who have resided five years in Arizona will deny. The moral is "see that you have a mine before you build a mill."

A Queer Location.

The Prescott *Miner* says: The following mining location was to-day recorded by the County Recorder at the request of the person who made the location. As will be seen it is probably the most extensive and unique instrument of its kind ever placed on record:

LOCATION NOTICE.

AFRICAN MINE.

I, the undersigned, have located this Grove as a placer mine according to the laws of South Carolina. This claim is square, being twenty-five miles long and fourteen wide, and takin' in all ranches and stock on it inside the aforesaid lines. I am a Soldier of the Cross, but have been on a furlough for the last ten years. This claim is located about twelve miles northeast of Prescott, and is in the Salt River Mining district. Dated on the ground, this, the 9th day of March, 1884. CALEB TAYLOR.

Too Many Miners.—We are informed by a party lately returned from the Quijotas that of the 800 or 1,000 men at that camp, only twenty are employed in the mines, the others, Micawber like, are "waiting for something to turn up." The mines, he tells us, are not sufficiently developed yet to allow of an opinion being formed of their richness. One mine, recently sold for \$120,000, and which has been published far and wide as a veritable bonanza, is nothing more than a prospect hole eight or ten feet deep. Many old Clobetites who hastened to the new camp when the excitement first began, are reported as strapped and wish themselves back again amongst us. The old reliable camps may suffer for a time from these meteoric excitements, but the tide will soon ebb and bring back what we have lost, with interest.—*Arizona Silver Belt*.

The Reno *Journal* says: There is some style in a mine like that owned by Ed. Harris. The other day it became necessary to pay off his hired men, and to do that he sat down with his hand mortar one day and pounded out \$1,300, squared his accounts, and went on with the work of development.

In the reduction of silver ores and other metallurgical operations between 2,000 and 3,000 tons of salt are disposed of annually on the Pacific coast.

USEFUL INFORMATION.

WHY EYES SHINE.—Place a child (because the pupils of children are larger) and by preference a blonde, at a distance of ten or fifteen feet from a lamp which is the only source of light in a room, and cause it to look at some object in the direction of the lamp, turning the eye you wish to look at slightly inward toward the nose. Now, put your own eye close behind the lamp flame, with a card between it and the flame. If you will then look close by the edge of the flame covered by the card into the eye of the child, you will see, instead of a perfectly black pupil, a reddish yellow circle. If the eye happens to be hypermetropic, you will be able to see the red reflex when your own eye is at some distance to one side of the flame. This is the true explanation of the luminous appearance of the eyes of some animals when they are in comparative obscurity. It is simply the light reflected from the bottom of their eyes, which is generally of a reddish tinge, on account of the red blood in the vascular layer of the choroid back of the semi-transparent retina, and not light that is generated there at all. This reflection is most apparent when the animal is in obscurity, but the observer must be in the light, and somewhat in the relative position indicated in the above-described experiment—that is, the eye of the observer must be on the same line with the light and the observed eye. The eyes of nearly all animals are hypermetropic, most of them very highly so, so that they send out the rays of light which have entered them in a very diverging manner.—*Popular Science Monthly*.

WHAT IS THE BLUE GRASS REGION?—This is a question strangers almost invariably ask. Strictly speaking, the Blue Grass Region of Kentucky is quite extensive, but the term, in its popular sense, applies only to the remarkable body of land in the center of the State, which comprises six or eight counties surrounding Lexington. This favored district, which a scientific authority has styled "the very heart of the United States," is underlaid by a decomposable limestone, which imparts to the soil an unsurpassed fertility, and gives to our grass, known to botanists as *Poa Pretensis*, a rich and permanent luxuriance which it attains nowhere else. Hence the term "The Blue Grass Region," a synonym for the acme of fertility of a district, which also bears the proud distinction of "the garden spot of the world." But why our grass is called "blue," when it never is blue, is one of the unsolved problems. It is always green except when in bloom, when the heads have a brownish-purple tint. If, however, the term "Blue Grass" is meant for an abbreviation of blue limestone grass, then it will do, for certainly it only reaches its highest perfection on our wonderful blue limestone soil. Propagated without cultivation, it comes up thick and juicy early in the spring, ripens in June, renews its growth in autumn, and, retaining its verdure in spite of snow and ice, furnishes abundant and unequalled pasturage during the entire winter. It is believed to be indigenous.—*Rancher's Guide to Lexington, Ky.*

ANOTHER USE FOR PAPER.—What cannot be made out of paper is something which cannot yet be safely decided. A Hartford, Conn., man has lately taken out patents for devices by which very beautiful and substantial carpets can be made of paper at prices much lower than the cost of common cotton matting. This new fabric even seems to have qualities entirely superior to ordinary carpets. It can be doctored so as to resist water, fire and insects without losing any of the soft elegance which is common to fine woolen carpets. So saith the inventor and his friends.

RAILWAY CARS DRAWN BY CAMELS.—It is said that railway cars drawn by camels will shortly constitute one of the peculiar features of travel and transportation in Central Asia. It is proposed by the Russian Government to lay a line of rails from Khiva, which is south of the Sea of Aral, in Turkestan, to Tashkend, a place of 40,000 inhabitants, nearly 600 miles further east. The road is to be built on the Blecher system—a kind of raised railway resting on peculiarly-placed sleepers—and will follow the course now taken by caravans.

A METHOD for rendering buildings fire-proof was tested in Chicago recently. The inventor claims for his design to confine the fire to the floor upon which it originated by covering the ceiling with thin sheet iron, and placing between it and the joist 3 or 4 inches of ashes, and above and around the space more ashes, on which the floor is laid. The test proved all that the inventor claimed for it, the joist not being damaged, though the heat was very great.

THE STORY told of a German needle-maker who bored a hole through a hair and threaded it like a needle has been denied; but now comes a New York paper which says the truthfulness of the story was recently demonstrated, or rather the fact that the story might be true was established by a Newark mechanic who plucked a hair from his own head, bored it at the first attempt, seamed the eye and threaded the curious "needle" with a silk thread.

A NEW BICYCLE DEVICE.—An Englishman has patented a device by which the front

wheels of two bicycles may be so joined as to permit the machines to be driven tandem by two riders. The advantage of this form of riding is that falling forward over the handles is rendered quite impossible, and another is that a greatly increased pace is attainable. Ascents and descents can thus be made when previously it was necessary to dismount.

THE LATEST NOVELTY A POCKET STEAM HEATER. Connecticut has been the birth-place of many novel inventions, but the device which the New Haven *News* describes as having been recently produced by a Bridgeport professor is surpassed by none of them in originality and daring. The paper referred to says of this invention, called the "portable body steam heater," that the apparatus is a small affair, consisting of a copper boiler, under which is a diminutive lamp, all incased in a nickel box, and balanced something like a compass, so that, no matter what position the outside box is in, the boiler and lamp will always remain in the required vertical position. The entire apparatus is so small that it can be carried in the pocket. After the lamp is lighted, the water in the boiler is heated and circulated through rubber tubes, which run down the legs, around the ankles, up around the back, and back to the boiler. The circulation of the warm water keeps the body warm on the coldest day. A safety-valve and escape for a higher pressure of steam than the affair is allowed to carry flows off at the back of the wearer's neck. Elaborate heaters are being constructed for ladies' wear. They can be worn inside the bustle, and entirely obscured. Before going out of the house the lady's maid can light the lamp, which, by the way, is gaged to run six, eight or ten hours, and "my lady" walks out under a full pressure of steam, and warranted to keep warm during the promenade.

THE LARGEST MATCH FACTORY in the world is located in Sweden. It contains an enormous novel machine which produces, it is said, 1,000,000 boxes of matches daily. Blocks of wood are fed in at one end of the machine and at the other end the matches come out arranged in boxes ready for packing. Twenty steamers and eight sailing vessels last summer delivered the wood from which the matches are made.

WHEN it becomes necessary to stop an engine with a heavy fire in the furnace, place a layer of fresh coal on the fire, shut the damper, and start the injector or pump for the purpose of keeping up the circulation in the boiler.

SPARKS FROM THE LOCOMOTIVE.—A prominent master mechanic asserts that a locomotive, drawing a train of six coaches and burning soft coal, throws out from 40 to 50 bushels of sparks in a run of a hundred miles.

GOOD MEALTH.

At Dinner.

At dinner, it is hardly necessary to say, we obtain a due proportion of the fats and oils in very varied forms. It is true we do not emulate the nutritive existence of the Esquimaux, whose dietary of blubber and fats constitutes the *summum bonum* of a life spent amid perpetual snow. But the quantity of fatty matters we daily contrive to ingest in one form or another is very considerable. From animal foods the fats are readily obtainable, and from vegetables, oils of various kinds are also elaborated. The necessity for fat as an article of diet is seen when we learn from physiology that it not merely conserves heat—a function seen in whales and fat persons generally—but supplies material when it passes into the blood which affords our bodily fuel. Fats and oils are "heat producers," and it is when the fat of the blood and the oxygen inhaled into that fluid from the air come into chemical combination, that heat is produced. It is needless to add that this process is being continually carried on in the human body, and to a greater or less degree in that of all other animals. "The starches and sugars" form the final materials into which we may resolve our dinner. A large variety of substances figure in the lists of chemists under the above designation. Common observation demonstrates that we daily consume large quantities of the starches and sugars in our food. A potato, for instance, may legitimately enough be described as a mass of starch and water; rice, and allied substances, are three-fourths starch; from bread we obtain a large quantity of starchy matter—all vegetables, in fact, contain starch in considerable proportions. Of the various "sugars" chemically so called, the latter remark practically holds good. Even milk—nature's typical food—contains a proportion of sugar in the form of sugar of milk, or lactine; and in the muscles of animals another peculiar "sugar" is found. There can be little doubt that from sugars and starches we obtain matters which, in the economy of the body, are readily converted into fat.—*Belgravia*.

Physiology in Schools.

The importance of a more thorough and practical study of physiology in schools is attracting much attention in all parts of the country. Essays in medical journals, addresses by prominent members of the medical faculty, and well

written articles in many of our local papers attest to the increasing interest that is being taken in this direction. We notice in a late number of the Los Angeles *Times* that Mrs. Dr. Sawtelle Dean, of the Woman's Medical College in this city, recently delivered an address before an audience of ladies in the Y. M. C. A. Hall of Los Angeles. One who was present speaks of the address through the columns of the *Times*, as follows:

"In eloquent and affecting language she portrayed the misery, suffering and so-called misfortune by the death of hundreds of thousands of infants in the United States, of persons sent to hospitals, insane or other asylums, and countless numbers at large of weak or unsound mind, deformed or ill-formed bodies, all arising from the culpable ignorance of mothers, wives and nurses. She advocated organized effort to render the hospital and other sanitary and humanitarian work what it ought to be and cannot be without woman's sympathy and co-operation.

"It is a small compliment to say that womanly hearts and tears were moved by her touching appeals."

By unanimous vote she was requested to take up the same subject on the following Wednesday evening, before an audience of both ladies and gentlemen in the same hall.

Appropos to the above a New York telegraphic dispatch of April 2d, in regard to the introduction of physiology and hygiene into public schools of that city, says: A large number of New York public school teachers met last night at the Broadway Tabernacle for mutual congratulations on the passing of the bill which provides for the instruction of pupils in all schools supported by public money or under State control, in physiology and hygiene, with special reference to the effects of alcoholic stimulants and narcotics upon the human system. It was stated that popular publishers were about issuing a series of cheap text books applying to the effects of alcohol on the system. The new law, which goes into effect next January, obliges teachers applying for a certificate to pass an examination in physiology and hygiene.

BOILED AND RAW MILK.—The cookery of milk is very simple, but by no means unimportant. That there is an appreciable difference between raw and boiled milk may be proved by taking equal quantities of each (the boiled sample having been allowed to cool down), adding them to equal quantities of the same infusion of coffee, then critically tasting the mixtures. The difference is sufficient to have long since established the practice among all skillful cooks of scrupulously using boiled milk for making *café au lait*. I have tried a similar experiment on tea, and find that in this case the cold milk is preferable. Why this should be, why boiled milk should be better for coffee and raw milk for tea, I cannot tell. If any of my readers have not done so already, let them try similar experiments with condensed milk, and I have no doubt that the verdict of the majority will be that it is passable with coffee, but very objectionable in tea. This is milk that has been very much cooked. The chief definable alteration effected by the boiling of milk is the coagulation of the small quantity of albumen which it contains. This rises as it becomes solidified, and forms a skin-like scum on the surface, which may be lifted with a spoon and eaten, as it is perfectly wholesome and very nutritious.—*W. Mattieu Williams in Popular Science*.

TOOTHACHE.—Those suffering from toothache will do well to follow this advice, as it is founded upon actual experience: For ordinary nervous toothache; which is caused by the nervous system being out of order, or by excessive fatigue, a very hot bath will soothe the nerves that sleep will naturally follow, and upon getting up the patient will feel very much refreshed, and the toothache will be a thing of the past. For what is known as "jumping" toothache, hot, dry flannel, applied to the face and neck, is very effective. For common toothache, which is caused by indigestion or by getting some strong sweet acid or anything very hot or cold in a decayed tooth, a little piece of cotton, steeped in strong camphor or oil of cloves, is the best remedy. But it should be borne in mind that a healthy person suffering from toothache must have been transgressing some of nature's laws, and that the pain is a warning that had best be heeded before it grows to something more serious.—*A. N. H.*

DEATH FROM PHYSICAL EXCITEMENT.—Cases in which death results from the physical excitement consequent on mental passion are, according to the *Lancet*, not uncommon. A recent instance has again called attention to the matter. Unfortunately, those persons who are prone to sudden and overwhelming outbursts of ill temper do not, as a rule, recognize their propensity or realize the perils to which it exposes them; while the stupid idea that such deaths as occur in passion, and which are directly caused by it, ought to be ascribed to "the visitation of God," tends to divert attention from the common sense lesson which such death should teach. It is most unwise to allow the mind to excite the brain and body to such extent as to endanger life itself. We do not sufficiently appreciate the need and value of mental discipline as a corrective of bad habits and a preventive of disturbances by which happiness and life itself are too often jeopardized.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

MAHONEY.—Cor. *Amador Ledger*: Taking the water out of the Mahoney progresses slowly. Several mishaps in the way of breakages have occurred since they started. A few days ago the chamber of the pump at the 500-foot level broke, which necessitated having a new one cast and put in. This will cause a delay of four or five days, and in that time the water will rise about 75 ft. They expect, however, to have the water all out in less than two weeks. G. W. Horn, the present foreman, is uncertain how long he will remain. After the water is out, if everything looks favorable, he may remain and take permanent charge of the works. S. D. R. Steward is prospecting at the Lincoln in two places. Besides the contract let for sinking near the Mahoney mine, he has a set of men at work north of the old Lincoln shaft, in the hope of striking the ledge running in that direction. The old shaft is so badly out of order that it is doubtful whether it can ever be used again for active mining. The sides have come together to such an extent as to prevent the passage of a bucket. Everything is running about as usual at the Amador Consolidated. Twenty stamps of the mill are kept going. There is no change to report in the character of the quartz, but the prevailing opinion is that it is paying expenses.

RED MOUNTAIN.—*Review*, April 5: In less than thirty days the number of men working in Red Mountain mines and prospects will be more than doubled. J. G. McOllough owns the Dipper and Genesee lodes, but has done very little work on either as yet, although both show mineral. The working force on the Yankee Girl is to be increased to 30 men. Seventy-six sacks of the bismuth and silver galena are ready for shipment. They are worth nearly \$1,000 each. Messrs. Thurston and Olsen are pushing developments on the Lisbon and Ottawa lodes below the Yankee Girl. They expect to tap the vein with their crosscut, inside of ten days. The Independence, situated on Independence mountain, is developed by a 50 foot open cut on the vein. The ore is concentrating, and mill-runs from several shipments to Chicago give \$52 to the ton. The Denver lode in Humboldt gulch will rank as a fine producer next season. Development consists of a 30 foot tunnel that shows a fine body of galena ore running 60 ounces silver and 40 per cent lead. The Bonanza Boy shows a good body of gray copper ore, and it is the intention of the owners to push development as rapidly as possible, as they feel satisfied they have a veritable bonanza in their claim. The returns from the ore shipped last fall were very satisfactory. Some fine looking mineral has been struck in the lower crosscut of the famous National Belle mine. The ore is solid and seems to be of a different character to that found in the caves above. Shipments will be resumed as soon as the roads are in a more favorable condition. The Silver Ledge has been worked steadily nearly all winter, and there is now something over 600 tons of concentrating ore on the dump. The ore-body is galena with a streak of high grade copper ore running through it. Shipments will be resumed in the course of six weeks or two months.

Butte.

A RICH MINE.—*Butte Record*, April 5: Probably the richest mine ever operated in Butte county is that now owned and operated by Mr. W. C. Pershacker. The reports of deposits taken out are really wonderful, and the gold seems to be inexhaustible. Several thousand dollars' worth of Pershacker gold dust was shipped to San Francisco from Chico yesterday.

El Dorado.

MILL.—*Georgetown Gazette*, April 4: The Revenge mine near Greenwood, is having a good five-stamp mill put upon it. Mr. F. R. J. Dixon is superintending the mine. We have much confidence in this mine, and predict that it will pay from the time the stamps begin duty, and will soon acquire a reputation of stability and worth. In the first place we believe the mine contains sufficient ore to justify a five-stamp mill; secondly, that the management of the mine has been placed in good hands, and will be practically and energetically worked within economic bounds, contrary to the expensive red tape manner in which so many of our mines have been operated and floundered. This is our reason for believing the Revenge mine will prove a success. The Eastern owners have used good judgment in placing the working in charge of Mr. Dixon, who thoroughly understands his business, and further he is reliable; and still further the mill is to be operated by his son, Wm. H. Dixon, who is a practical amalgamator, always commanding the first place in a mill, besides being possessed of that highest of all recommendations, an upright character.

Inyo.

FURNACE FOR DEEP SPRINGS.—*Inyo Independent*, April 5: Mr. McMurtry, of Big Pine, has returned from San Francisco. He has perfected arrangements to move the old Montezuma furnace across the mountains to Antelope Springs, Deep Spring Valley, where it will be put to work on ores of that section. The furnace will be moved immediately.

BONDED.—The noted Kearsarge series of mines and the old ten-stamp mill has been bonded for a large amount to P. J. S. Tulley, the agent, who is backed by millionaires. Work on the mines will be commenced as soon as the snow will permit. This move has the true ring, and is founded on true business.

THE QUEEN.—Work on the famous Indian Queen mine, in Onocota district, has been prosecuted all winter with a force of 16 men. New ground is now opened by a long, deep tunnel, and preparations are being made to start the mill as soon as the deep snow clears away.

SNOW CANYON.—The mill at Snow canyon started up on Saturday last for a run of 25 days or more. The ores are from mines belonging to Stapp & Morton and to Bob Mitchell and Billy Smith.

THE MODOCK.—Supt. Fitzgerald says of late operations at the Modock works at Lookout: "Amount of ore received at furnace during the week, 51 tons; the output is now increased to nine and a half tons per day. The Antelope mine is opening

up very well; the shaft is down 18 ft, and 21 tons of ore have been extracted in sinking it. The furnace cannot be started up before the 21st inst., as coal is not coming in fast enough."

Mono.

CLOVER PATCH.—*Inyo Independent*, April 5: Messrs. Nixon & McDermott, with a force of nine men, have been engaged for several months in opening out the Wild Rose mine at Clover Patch, in Southern Mono. The developments are such as to insure the steady running of the five-stamp mill until next fall. The snow lies all over the country to a depth of from four to ten ft, rendering locomotion impossible and the matter of getting in supplies extremely difficult.

STANDARD CON.—*Bodie Free Press*, April 8: Last week there were extracted and shipped to the mill 481 tons of ore, and 1,118 ounces of crude bullion were received. Yesterday \$11,427 were shipped to the company. North drift No. 2, 700 level, has been run six ft; total length 170 ft, showing six ft of vein. The upraise from this drift has been raised nine ft; total height 139 ft, to a point where the vein is six and a half ft wide, and continues broken and mixed with porphyry.

BODIE CON.—Since the last report they have started a drift south from the west crosscut on the 200 level to connect with upraise No. 1 from the 300 level. This drift is on the Fortuna ledge and has gained a distance of 18 ft. So far it shows ore of a low grade. Upraise No. 1 on the 300 level has reached a height of 162 ft, without any change. The south drift, 300 level, Fortuna vein, has gained a distance of 20 ft; total length 198 ft, no change. The upraise on the 422 level is up 104 ft—a gain of eight ft. The vein is one and a half ft wide, with spots of good ore; but, on the whole, it is of a rather low grade. The ore for the mills is principally taken from the Vulcan vein.

GOODSHAW.—On the first of the week the work was changed to the south drift on No. 3 ledge, 600 level. The face of the drift shows about two ft of good quartz, the vein matter being about 6 ft wide. The indications are very encouraging for a valuable development.

BODIE TUNNEL.—The crosscut, run by contract, was pushed ahead about 10 ft, on ground that is quite promising. They will probably have something encouraging from this part of the county very soon.

BULWER CON.—The south drift from west crosscut No. 2, 500 level, has been advanced 12 ft during the past week; the total length being 173 ft. The vein still holds a width of 15 inches.

PLACER MINING.—*Helena Independent*, April 4: Now is the time when the placer miner begins to set his boxes and prepare for spring sluicing. Tools are gathered from under the bunks and in the corners of the cabin, a new supply of "quick" secured, more grub, another man or two, and the work goes bravely on. To the placer miner, more than to any other, perhaps, the opening of spring is the beginning of a new era. After chafing in his cabin or lounging about the more populous places all winter, the prospect of once more engaging in the exciting and pleasurable pursuit of washing the "pay dirt," is something those only can appreciate, who have engaged in the business. But year by year the mines are becoming exhausted, and the men who worked them are gradually drifting into other business. Still, placer mining will be carried on for many years in Montana. Although considerably reduced in numbers and richness, there are numerous gulches that pay a handsome profit. Snow is plentiful on the ranges, and of course there will be an abundance of water to sluice with; and before long the sacks of dust to be exchanged for legal tender notes and coin will be considerable.

Mariposa.

THE MARTIN AND LEARY MINES.—*Herald*, April 4: J. H. Dunshie, mining expert, visited the Leary mines on Devil's gulch last week, at the instance of Dr. W. N. Martin, of San Francisco, a partner of Mr. Leary's. A *Herald* representative met Mr. Dunshie at the Gallison hotel last Sunday evening, and asked him what opinion he had formed of the mines. He stated that the value of the different claims had been greatly misrepresented by outside parties to Dr. Martin, for he considered them all promising mines. The quartz prospected well and could be worked at a fair profit, the only drawback as far as he could see, was the difficulty of ingress and egress to the mines. The placer mines he thought were excellent, as it would be an easy matter, with the facilities he has for working them, for Mr. Leary to make \$10 a day for every man employed. Three men are now working the placer claims.

Napa.

MINES NEAR CALISTOGA.—*Calistogian*, April 4: Messrs. Grigsby & Johnson have decided not to sink their shaft, in which work has been going on day and night the past winter, to the depth proposed last fall. It is now 160 feet deep, and a station will be made at this point, and drifting toward the Palisade and Easley veins be commenced. This drift or crosscut will necessarily be 118 feet long through very hard rock. When the Palisade vein is reached, a distance of about fifty feet if we remember correctly, more men will be set to work and ore be taken from this vein, while other miners will continue the drift toward the Easley vein. This change of programme will result in more extensive operations at an earlier date than was formerly intended. But the 118-foot drift will perhaps require four months for its completion, and probably little of importance will be done until it is finished.

Nevada.

TRINITY MINES.—*Transcript*, April 4: Geo. Gray and son are working a quartz ledge on Piety Hill. They having a good crushing out and yesterday it was being hauled to the mill. Locklin & Co., who have several quartz ledges near Worrell's ranch, have resumed work. The late high water in Deer creek did a great deal of damage to their reservoir and ditch, and the mine was filled with water. It is now pumped out and everything is running smoothly. Their mill is running on custom rock at the present time. They have just completed a crushing of 35 tons for a Willow valley company, and yesterday contracted to crush another lot of 100 tons for another prospecting company in the same locality. Since the bonanza has been developed in the Hussey & Hussey claims there is a great deal of prospecting going on in that section. Indications point very strongly that lively times are in store for that rich and long-neglected quartz district. Durbin & Co.

are making preliminary arrangements to start up their mine. They have a good prospect, but only sufficient work has been done on it to comply with the law for many years. A hundred ft of tunnel was run. The ledge shows from two to three ft in thickness and is of low grade. The owners did not have the capital to go in search of a pay chute which is believed to be there, and work was suspended. The Durbin will soon be heard from now there is such great activity in quartz in the Willow valley district. The McCormick quartz property, on Gold Flat, from all indications promises to equal if not excel any in this district when the proper work is done on it. It requires considerable capital to open it up, it should be, and the owner is not in a financial condition to carry the work forward. He has sunk two perpendicular shafts and an incline down on the ledge. The incline is down about 95 ft—both the shafts, perpendicular, being about 35 ft from the surface. When this distance was reached, with a very light pumping rig, the water drove the miners out. They, however, succeeded in getting some specimen rock which was "lousy" with gold, and would certainly yield \$4,000 or \$5,000 per ton. Owing to the heavy influx of water, the extent of this rich strike in the incline shaft is not known. At the two perpendicular shafts, which were sunk some distance apart, the specimens taken out were very rich, giving evidence that the find was a very valuable one. Pumping has been resumed in the incline and before long we expect to learn more particulars of Ham. McCormick's bonanza. If fully opened this mine would give employment to one or two hundred men. The Mountaineer mine, adjoining the Merrifield on the east, is increasing in value every day. They are taking out some splendid looking rock and the San Jose stockholders are in receipt of regular dividends. At the Wyoming, adjoining the Merrifield on the west, some very rich rock is being taken out. Yesterday morning Supt. Buffington brought into town a five gallon can filled with rich specimens. Many of them looked as though they were all gold, being without much quartz. The Champion Company are taking out some fine looking rock. The new shaft, which is down about 100 ft, has tapped a fine looking ledge. Workmen are still running the main tunnel in the direction of the new shaft, which is about 300 yards from the line of the Nevada City mine. The stockholders have strong faith in the mine proving a success. It ought to, situated as it is in the known rich quartz center of this district.

RICH QUARTZ.—*Transcript*, April 4: Some of the richest quartz ever seen in this or in any other country was taken out of the Wyoming mine on Saturday last. Some of the pieces contained more gold than quartz, and reminded one of '49 times when specimens of that character were more common than now. Over \$2,000 was taken out in a very short time, and there was more in sight. One of the pieces was a beauty. It was a piece of quartz about 12 inches wide and 18 inches long, and in it was a streak of solid gold two inches thick running through the entire piece. Such a discovery as this in any other part of the world would attract thousands of people to the place. The Nevada City quartz mines present a better appearance than in any other section of the State, and we believe there are hundreds of ledges in this region that won't show up as well as the Wyoming the same amount of work done on them. There is no better field for prospectors than this part of the country presents.

Plumas.

BETTER.—*Greenville Bulletin*, April 4: Mr. Johns was down at the Rich Gulch mine last week, and not being quite satisfied with the looks of the mine, asked for an extension of two months on the time fixed for closing the contract for the purchase of the mine. This was readily granted. Since then the ore body has opened up far superior to any hitherto seen there. The work of opening continues at the expense of the Plumas Eureka company, Mr. Halstead has the privilege of working all the ore that is taken out, and is said to be making a good thing of it. No doubt is entertained that if Mr. Johns had delayed his visit another week the purchase of the mine would at once have been consummated.

HALLSTED LEDGE.—*Plumas National*, April 5: Our readers will remember that some time last fall Mr. Wm. Johns, as an agent for the Plumas Eureka company, bonded the Hallsted quartz mine, on Rich Gulch. The bargain was that the company should put in a tunnel at a depth of 200 ft, to tap the ledge, and then have the privilege of drifting away from the tunnel a certain distance. If then satisfactory, they were to buy the mine, the price fixed on being \$60,000. The work has been done, and last week Messrs. Johns and James went down to the mine. They report that it looked very encouraging, but did not consider that it had been satisfactorily developed, and asked for and obtained an extension of time to look into it further, until July 1st. The force of men has been increased, and work will be pushed vigorously for the next three months. A rumor is afloat that some rich rock has been broken since they came back, but we have but little faith in the report. It may be true, however, as the rich pay chimney which shows above must be near the header below. There is good reason to believe that a large and permanent quartz property will be the result of the work, and if the Plumas Eureka company purchase it, they will work it in such a way as to make it profitable to the owners, and of great public benefit.

Placer.

HYDRAULIC MINES RUNNING.—*Grass Valley Union*, April 4: The *Euc*, acting as the watch-dog of the Anti-Debris Association has its smelter constantly turned in the direction of the hydraulic mines, and is now claiming that all the claims in the vicinity of the Dutch Flat (with the exception of the Gold Run, which was enjoined) are in active operation. As the claim alluded to, and many others throughout the mining region have never been enjoined by the courts there is no reason why they should not be at work. It does not follow that because a few mines have been enjoined the others must shut down in consequence. They are not in contempt of court.

Sierra.

CLEANUP.—*Mountain Messenger*, April 5: The cleanup for last week at the Extension works was nearly 214 ounces. A quartz boulder containing 20 ounces of gold was found.

WILL DRIFT HEREAFTER.—*Sierra Tribune*, April 5: The Sears Water Company recently notified Col. B. F. Baker, owner of the Pioneer mine at

Grass Flat, that unless he paid \$32,000 within 10 days for water furnished him last year and in advance for that to be used the coming season, that they would cease to supply him. Col. Baker was in town a few days ago and declared his intention of canceling the contract heretofore existing between himself and the Sears Water Company, as he has no further use for the water. The reason of this is that he has decided to work his mine by the drifting process in the future. The Pioneer ground is very rich and there is no doubt but that it will pay equally as well to drift as it did to work by the hydraulic process. We are informed that the owner will employ white men exclusively under the new regime. It is to be hoped that other mine owners over in that section will follow Col. Baker's example in this latter respect.

NOTIFIED TO STOP WORK.—Word was received here Sunday that a notice had been served on the Brandy City Mining Company to stop work within six days and in case they failed so to do lawful proceedings would be commenced against them forthwith. This is the first blow Sierra county has received from the valleyites. Oh, no, they won't trouble any mines in Sierra county. That is the kind of bait the Marysville people used in fishing after the trade from this country, but they had no idea of following it out, as the sequel shows.

MORE CAPITAL COMING.—We understand that J. H. Thomas, the mining operator, is on his way from Europe to this State and that he comes with a million and a half of capital to develop drift mines in northern Sierra and Plumas counties. Mr. Thomas has been across the water for some time trying to get capital interested in this enterprise. We only hope that he has succeeded as fully as the reports indicate. If he has, our northern neighbors may look for lively times in the course of a year or so.

San Bernardino.

BULLION REPORT.—*Calico Print*, April 5: The Bismarck mine shipped \$4,662 in bullion to San Francisco on the 31st of last month. Twelve tons of first class ore from the Garfield mine was shipped to San Francisco on the third. The Oho Grande mill shipped on the 29th of last month, \$6,530 in silver bullion to San Francisco; on the 31st \$3,000, and on the 1st inst \$5,100. We have received the following authentic report of the bullion product of the Bonanza King mine of Providence. The amount for the year 1883 was \$573,375.85. For the month of January \$56,277.53; for February \$44,967.78. Total yield to March 1, 1884, \$674,620.16.

BONANZA KING CON. M. CO.—We learn from a reliable source that the west crosscut North 5th level has been driven 90 ft on the ore vein, connection having been made between the 4th and 5th levels on this ore vein, which render available a large extent of sloping ground. A winze has been sunk on this ore vein to the depth of the 6th level, showing a continuous body of ore. The north lateral drift, 5th level, will have to be run 50 ft to intersect this winze. Crosscut opposite shaft 5th level has cut the center main vein of ore, giving assays of \$48 per ton. The new ore body is 100 ft further east than any former development, close to the contact of lime zone and porphyry; at this point it is 10 ft wide, assaying \$200. The main shafts are being sunk and is now 20 ft below the 8th level. The past severe weather has delayed ore hauling, and consequently effected the usual product of bullion. For the first three weeks of this month \$33,600.48 has been shipped to San Francisco. The mine throughout is yielding finely and never looked better.

Trinity.

PAYING WELL.—*Trinity Journal*, April 5: From the Messrs. Blakemore, who were in town last week, from Eastman district, we learn that they have made two partial cleanups of their armata and that the amount realized averaged \$110 to the ton of rock crushed. When a final and complete cleanup is made it is expected the average rate will be considerably increased. We are further informed that they will now push prospecting in the mine with a view to determining the extent of the ore body and that if it proves nearly as large as it promises a mill will be erected during the summer.

HYDRAULIC MINERS are all at work, with a fair supply of water. More could be used if it would come.

Tuolumne.

RICH STRIKE IN THE BUCHANAN.—*Union Democrat*, April 5: We learn that a chute of extraordinary rich ore has been struck in the Buchanan mine. The strike was made in a drift north of the shaft, on the 300 level. The vein is very wide, averaging five or six ft, and shows great strength. The chute has been drifted on upwards of 40 ft, and still maintains its full size, showing no signs of pinching out. Messrs. John A. Davis, Alvinza Haywood and William Hamilton went up Sunday and examined the mine, and expressed themselves as highly pleased over the showing. They brought down some large pieces of ore, which were really magnificent to look at. It is a beautiful ribbon quartz, with streaks of coarse free gold running through it. The specimens shown are exceedingly rich, but the posted ones say there is plenty more of the same character. From reports it would appear that a veritable bonanza is in sight. Some of the quartz has the same characteristic of the Lamphier rock, having free gold intermixed with and clinging to the sulphurets. This important development will probably give additional impetus to mining in this section.

NEVADA.

Washoe District.

ALTA.—*Enterprise*, April 5: The east drift on the 2150 level is being advanced in ground, showing more quartz than heretofore. There is not much increase of water. The west drift on this level is in vein material that shows streaks of quartz carrying some metal. The pumps are working well, and handle the water without any difficulty.

GOULD AND CURRY.—The drift on the 2700 level is making good headway in very fair working ground. It is still very hot. The drift north from the 2200 level of the Bonner shaft is making good headway and will soon reach the Consolidated Virginia line, its objective point.

COMBINATION SHAFT.—The west drift from the 2800 station is making good headway. It is of sufficient width for two car tracks. A good circulation of air will be obtained as soon as connection is made with the southeast drift of the 2800 level of the Hale and Norcross.

HALE AND NORCROSS.—The southeast drift on

the 2800 level is being pushed ahead as rapidly as possible to the point where it will connect with the drift west from the Combination shaft. The ground works well and is of a favorable appearance.

SIERRA NEVADA.—The northeast drift on the 3100 level is making the usual progress, and is passing through vein material of a promising appearance. The winze between the 2300 and 2400 levels is being repaired.

UNION CONSOLIDATED.—The water has a good deal drained out of the ground to the east of the main north and south drift, and east crosscut No. 2 is again being advanced.

MEXICAN.—Are sinking the winze on the 3100 level. West crosscut No. 3 is making the usual headway, and good progress is making in east crosscut No. 2.

ANDER.—Some ore that will pay for working is still being obtained, and the prospecting drifts are developing quartz of a promising appearance.

YELLOW JACKER.—The usual amount of ore is being extracted, and the mills on the river are kept going to their full capacity.

ONIAK.—Are extracting ore on the 150 and 250 levels, and are running exploring drifts on both levels.

BELCHER.—The usual quantity of ore is being extracted and sent to the mills on the river for reduction.

SCORPION. The usual progress is making in the west drift, and the material shows no special change.

IMPERIAL.—Some ore that will pay for working is being found in the explorations on the old upper levels.

CROWN POINT.—The usual amount of ore is being extracted, and all the mills are running regularly.

SAVAGE.—There is still a considerable flow of water from the north drift on the 2600 level.

BEST AND BELCHER. The usual headway is being made on the 2700 level. The drift is still quite hot.

U'FAIR.—Are running a north drift on the 1950 level at a point 75 feet east of the station.

UNION SHAFT.—Are repairing the drain drift on the 1600 level leading out to the Suro tunnel.

CALIFORNIA.—The east drift on the 2900 level is making the usual progress.

CONSOLIDATED VIRGINIA.—The east drift on the 2900 level is making the usual progress.

Columbus District.

SILVER BOY.—*True Fissure*, April 4: Flattering results have been obtained from the work done on this property. Another ledge has been cut in the tunnel. It is much larger and stronger than the one previously encountered. The ore is of high grade, the lowest assay being \$81 per ton. The ledge dips to the north, the same as the first one found, and it is probable the two will connect and form one large body of high grade ore. The appearances indicate that the mine will prove a bonanza for its owner, Johnny Leidy, who is much elated with his prospect. The mine has been visited by several people, all of whom speak of it very flatteringly. As it lies at the eastern end of the chloride belt, it will cause more active operations among the claims in its neighborhood. The ore looks like and is of nearly the same character as that found in the Northern Belle and Mount Diablo mines. There is a fair supply of water and wood near the mine, and a good road to it can easily be made. The old Mount Diablo quartz road could be utilized, the mine being situated within two hundred yards of it.

COLUMBUS CON.—The crosscut from the fourth level was extended 10 ft. during the week, the face showing no material change. The main drift on the third level has been extended 5 ft., making a total length of about 260 ft. There is no change in the face, it being about the same as at the time of the last report. The west drift, from the main drift on same level, has been extended 10 ft. Its total length is now about 60 ft. No development has been made in this drift, but the prospects are very flattering.

MOUNT DIABLO.—There are no special changes to report from the mine for the past week. Winze No. 5 is now down 124 ft. and a drift will soon be started from the bottom of the same to connect with the east drift from the bottom of Winze No. 4. In the intermediate, between the second and third levels, a crosscut is being driven to the south from the Callison winze, and has developed some low grade ore.

Taylor District.

ARGUS.—White Pine *News*, April 5: A new strike of much importance is reported in the Argus Company's mine, 125 ft. below the surface. The Monitor mines are looking better than at any time in the past, and vigorous prospecting is going on.

White Pine District.

THE EBERHARDT.—*News*, April 4: Work at the Eberhardt tunnel is, at the present time, conducted with a force of 12 miners. It is a well known fact that the ore has been discovered in the main tunnel, and the unbounded confidence that Supt. Drake has in the property is shown by the improvements he has made there, and the extensive work he is doing lead the knowing ones to think that the ore bodies are of much greater importance than the managers of the mine care for the outside world to know of. As soon as the weather moderates and machinery can be moved with ease, an extra force of 20 men will be put to work in the tunnel, and prospecting will be carried on by means of Burleigh drills. There are several places in the main tunnel where streaks of ore have been found that will assay from \$70 to \$700 a ton, and it is the intention of Capt. Drake to prospect some of those, in the belief that they will lead to important bodies of ore.

ARIZONA.

BAD ROADS.—*Pinal Drill*, March 29: The renewed rain has again so damaged the roads that all hauling of ore and wood is stopped. The Silver King Company's mine and mill are both idle, the first because they have too much ore on hand which they cannot get rid of; the latter because they have not got the ore at the mill. The "Windsor" Company's mill at Pinal is rented to the "King" Company, who have taken it on a lease of one year. Mr.

Wheeler is working the Eureka mine on rich ore. The "Australia" is charged with ore which cannot be hauled over the wet roads, and the smelter is therefore idle and out of wood. The wagon road and chute are finished. The usual work goes on in the district as far as weather will permit. The "Lost Prize" is as promising as ever. They have now a double compartment shaft of considerable depth from which to tap the vein. The "Specie-paying" has its mill building ready for the machinery, but like all the rest of mankind now, weather bound and at anchor.

BONANZA MINE.—*Quijotoa Prospector*, April 4: Work continues with unceasing vigor on the Bonanza Company's mines. As the tunnels acquire depth prospects are growing correspondingly better. The ore stringers that have been noticeable for the past few weeks are sure indications that the vein is not far distant. At any time the news of the tapping of the ledge may be given to the world. From calculations made by the *Prospector* (not allowing for a dip) the vein is still distant about 70 ft. The winze still continues to be driven downwards through high grade ore.

PEERLESS.—Tunnel No. 1, (east side) was in 130 ft on the 22d instant. At no time since the tunnel was started has the outlook been so favorable as it is at the present time. Stringers of ore are coming in through an oxide of iron formation which is very soft. Tunnel No. 2, (west side) has attained a length of 100 ft. The formation is very similar to that given in last week's report.

PEER.—Peer tunnel No. 3, (west side) is 85 ft in length, and is being driven through the same kind of rock that it has been going through for the past 20 ft.

CROCKER.—Tunnel No. 4, (east side) was in 77 ft when the last measurement was taken, which was on the 22d instant. The formation was heavily stained with iron and was softer than last week. Stringers of ore and quartz are becoming more common, and the outlook is much better than it has been since work was commenced.

HORSE MOUTH.—The Horse Mouth cut was in 16 ft on the 26th instant, and all in ore that runs from \$10 to \$60 per ton.

WINZE.—The winze on the 22d instant was down 35 ft in high grade ore. Sinking is being pushed as fast as possible.

SHEEP NEST.—The tunnel in the Sheep Nest mine is being pushed as rapidly as skilled labor can advance work. It continues in good ore and the prospects never have been more favorable than they are at present since work was commenced on it. Some of the principal owners of this mine are expected to arrive this week from San Francisco.

NOTES.—*Prescott Courier*, April 3: Mr. McCann has found what is said to be a very rich and large copper mine, near Walnut Grove. Mr. Chase has started operations on Turkey creek and in Pine Flat. The shipment of ore from the Silver Belt has commenced. Judge McPhee and Mr. Rice think they have a good silver mine near Bumble Bee station, Black canyon district. They have an 18-inch vein of ore which assays over \$300 a ton. The Peck pump is engaged in trying to dry the mine, in which there is a great quantity of water. Mr. Clark will very soon place heavier machinery in his Groom creek mill. Placer miners are taking advantage of the present fine weather and abundance of water. They are washing a great deal of gravel and finding plenty of gold. We have heard of a few men here who talk of going to Cœur d'Alene. An effort is being made to induce men to go to the Sierra Madres.

COLORADO.

MINERAL MENTION.—*Colorado Miner*, April 4: A mill run from A. A. Walling lode, at Empire, gave a result of over \$100 gold per cord. The Rainbow lode, at Empire, shows in the slope from eight to ten inches of free milling ore, and in the breast of the main drift has over eight inches of ore. The free quartz runs over \$100 per cord and the iron about \$30 per ton, gold. The Tom Moore lode, on Columbian Mountain, is coming to the front with fine prospects. The northwest end of the lode has been opened by open cut, and shows a small but very rich streak of ore. The crevice is well defined and the quartz streak about ten inches thick. The Choctaw lode, on Saxon mountain is proving to be a better lode than even the owners thought it was. A mill-run this week went 170 ounces silver and 60 per cent lead. This lode is the property of Barnes, Cherry & Tonay. Frank Hartsell will soon start up work at the Moline tunnel again. This is one of Clear Creek County's largest producers, and we are glad to hear of the resumption of work. Mr. Hartsell is now preparing to place at the tunnel a new plant for compressed air drilling, which will greatly facilitate the work. The Virginia mine, situated in Spring Gulch, near Dumont, owned by Mr. Ed. Peart, is proving to be one of the best mines in that portion of Clear Creek County. The crevice is over three feet wide, and the mill-dirt, without sorting, that comes from it, runs three and one-half ounces in gold. The smelting ore is from five to eight inches in width. Mr. Peart brought a load of ore to this city last Wednesday, that gave him the handsome returns of four ounces in gold, and 35 ounces in silver.

DUMONT.—The Keith tunnel is being driven ahead rapidly. The Senator improves right along with development. The Big Horn lode is now under lease. We expect to hear good reports from this claim in the near future. The Standard lode now has exposed a vein of smelting ore about ten inches thick, and about two and one-half ft. of smelting stuff. A carload of ore from the California will be shipped, the fore part of the ensuing week, to Denver. Regular shipments, it is expected, will be made semi-monthly. The old Virginia is panning out right along. Sixty three sacks of auriferous quartz were shipped from this claim Wednesday, to Georgetown.

IDAHO.

FROM MULDON.—*Wood River Times*, April 2: Colonel Bullantine, superintendent of the Little Wood River Mining and Smelting Company, came into Hailey to-day, for the first time this winter. He reports Muldon pretty badly snowed in, and provisions and supplies on hand for only 30 days longer. A force of about 15 men has been kept at work all

winter on the company's mines, doing development work. In running drifts, etc., between 400 and 500 tons of ore have been extracted, which are now in the yard at the furnaces. There is a large quantity of ore in sight in the company's mines, and the supply is ample to keep the two 40-ton furnaces going uninterruptedly. These will be blown in as soon as the weather and roads permit—which, from present appearance, will not be before the middle of May.

THEY WILL GO.—*Idaho Statesman*, April 5: The rush to the Cœur d'Alene mines is reaching alarming proportions in spite of all the cold weather that is being poured on the business. True, there is comparatively little actually known about the extent and richness of the mines, but people will believe that where there is so much smoke there must be considerable fire, and they will go and see for themselves. The coming summer will see many thousands of people in those mountains, a handsome percentage of whom will remain and develop whatever resources there may be in that country. There is a vast unexplored and unprospected mountain region to be examined this year, and it is quite within the range of probable events that there will be enough good mines discovered and developed to secure a large and permanent mining population.

CŒUR D'ALENE ITEMS.—*Nugget*, March 29: The "Widow" is being regularly worked, and is paying well. On Granite creek, three dollars to the pan has been found during the past week. An offer of \$50,000 was made last week for the Mother lode, and was refused. Work has been commenced on the Union ditch which is to furnish water to work the claims between Osborn and Eagle City inclusive. The work will be conducted under the management of J. W. Porter, the lessee of the Pritchard claim, and will probably be completed in about one month, and will carry from 1,000 to 1,500 inches of water. It hardly seems as if laboring men, or those willing to work, ought to starve in a forest country where wood brings from \$12 to \$15 per cord, and is scarce at that price. Good prospects are reported from Perry gulch, near Eagle City. One party reports having panned out seventeen cents to the pan. Two men dug a hole about four ft. square down to bedrock and cleaned up two ounces of gold, near Murrayville, last Wednesday. Wood has risen from ten to twelve dollars per cord for four foot and from fifteen to eighteen dollars per cord for stove wood. The reason is that every stick has to be drawn one or two miles on little sleds or toboggans, and the road is so bad that three men can hardly cut and haul a cord per day. The proprietors of the Mother lode have a strip uncovered a few feet square, in which, it is estimated by experts, \$2,500 worth of gold is in sight. The rock is literally filled with it. Fifty dollars has been offered for the privilege of cutting off a small slab of this rock, and \$5 per specimen is frequently offered for small pieces. All offers, however, are refused. The spot is kept covered from sight, and is carefully guarded.

QUARTZ CLAIMS.—In Fancy gulch, about four miles from here, Henderson, Porter & Co. have a very large ledge that shows free milling gold. As soon as the snow will permit, a tunnel will be run and a cross-cut of the ledge will be made. Employment will be given to a large number of men. This claim is known as the Golden Chief, and promises well. J. B. Stevens & Co. own an extension of the ledge on which the Golden Chief is located. This extension is called the San Francisco, and the quartz is of the same nature, and also shows free gold. The owners of these two claims will put up such milling machinery as may be necessary to work the ore, providing the developments justify present expectations. Those acquainted with these claims have high hopes of their richness, and of the quantity of good ore in the ledge.

MONTANA.

NEW MINES STRUCK.—*New Northwest*, March 5: Mr. John F. Straubal, of St. Paul & Co., Garrison, gave us yesterday some items concerning a placer find near the Palmer ranch, on Lower Warm Springs creek. The find has been rumored for several days, but even as yet little is known concerning it. It appears that not long since John and David Irwin, two Leadville men, prospecting near the mouth of the creek, but more recently have gone three miles up the creek, which we believe would take them below the falls, and commenced work. On Friday evening of last week they came into Garrison, hired seven men, outfitted them with picks, shovels and provisions, and started back. They had some placer gold a sample of a few dollars of which Mr. Straubal purchased. It is not much washed, has considerable quartz in it, and is very coarse. They were uncommunicative and did not desire to give any more information than could be avoided. Wednesday night of this week the entire section gang on the Northern Pacific at Garrison—nine men—left and went over to Warm Springs creek, some five or six miles, to the diggings. It is stated the claims are being taken up in 20-acre lots. Mr. Straubal, on Wednesday, bought all the picks in Deer Lodge, and is having more made. Mr. Phil. E. Evans went to the scene of the find yesterday, and on his return more definite information will be obtainable. The find is northeast of the Pike's Peak, or Yamhill district, and not far distant. The striking of paying mines there is not improbable.

ANACONDA.—*Cor. Butte Miner*, March 5: Active operations are in progress at the smelter. Not far from 100 men are on the pay-roll, and about the same number are in the employ of the railroad contractors. The heavy cuts north of town are rapidly nearing completion, and it is believed freight by rail will be delivered here inside of sixty days.

THE ORIGINAL.—The Original M. Co. of Butte yesterday declared its thirty-second consecutive monthly dividend of \$3,000, making a total of \$96,000. A good reserve is on hand. The mine is in good shape, the production of good ore is regular, and the usual monthly dividend is assured for a long time to come. Operations in the property are confined to the extension of the east 200 foot level, to the development of the vein at a depth of 400 ft and to the stopes from the winze between the 300 and 400 levels. The ore is of uniform grade, averages in assay value \$75 per ton, and is shipped for reduction to the Colorado smelter.

NEW MEXICO.

KINGSTON.—*Mining Herald*, April 5: The U. S. mine is taking out fine high-grade shipping ore.

The Forest King, with 300 feet of development done looks well. From the Kingston mine beautiful specimens of ruby silver are obtained. The Iron King mine comes to the front with 30,000 tons of ore on the dump. The Polar Star mine has been stocked, and everything ready for an early start. The Superior is taking out ore which averages from nine to fifteen hundred dollars a ton. There is enough ore in sight in this mine to keep two hoisting engines busy day and night. They are at present working the 200-foot level and extending the 300-foot level, to eighteen inches in width, of 600-ounce ore, at a depth of 12 feet. The ore lies in lime, and dips toward the lime. The owners are sacking the ore preparatory to shipping. A magnificent strike was made a few days ago on the Brush Heap. It consists of sulphide ore which assays 1,000 ounces to the ton. The Brush Heap people are patiently waiting for the smelter to open up, when they will be able to dispose of the large quantity of ore now lying on the dump. The concentration works of the Kingston Mining and Milling Company are in full blast with a double force of men. They are now running ore from the Bullion mine, and reduce about ten tons per day. Before this ore runs through the works it is worth about forty dollars per ton, when worked it is worth \$300 per ton. Mr. F. G. Caldwell is the superintendent in charge. The new hoisting works on the Bullion are now completed, and working satisfactorily. The drifts are rapidly being cleared of the ore and waste which had accumulated while the working shaft was being sunk and the machinery put up. A carter car comes up loaded with sacks containing the rich ore for which the Bullion is famous. As soon as the drifts are entirely cleared a large force of men are to be put to work. It is surprising to consider the short time in which, under the able management of Mr. Chapman, the Bullion arose from a mere prospect to one of the richest mines in New Mexico.

MAGDALENAS.—Large blocks of galena ore have been found on the Ambrosia, weighing 20 tons or more. The Kelly runs 40 per cent and upwards in lead, with silver from 10 to 50 ounces to the ton. The ore runs about 45 per cent lead, and as high as 50 ounces of silver to the ton in the Stonewall. The Mackay lode has a shaft of 65 feet, and is very rich in chlorides, native and horn silver. Assays run from 80 to 600 to the ton. The Lucky is six feet between walls, carries gray copper and brittle silver, and assays from 20 to 200 ounces in silver. The pay streak is about 20 inches in width. On the Juanita a cut across the vein of 50 feet from one wall does not reach across it. In this cut is found one ore body 13 feet thick and another 6 feet thick.

OREGON.

NEWS.—*Jacksonville Times*, April 5: The Shepley claim in the Siskiyou is yielding some fine specimens of gold. Many of the miners in Josephine county will make a good run this season. It is reported that John Rush of Evans creek has discovered a rich bed of chrome. Much more rain has fallen in Josephine county than here; consequently, the miners have more water. Roten Bros., of Harris gulch, in Willow Springs precinct, are cleaning up and expect to do fairly. They have picked up some neat pieces of gold already. The supply of water is decreasing in some localities, and cleaning up has commenced. The season has not been a protracted one, but better than at one time anticipated. Wm. Bybee has returned from Josephine county. He informs us that he has discharged all the hands employed at his mines near Waldo, excepting two, who are cleaning up. The season has not proved a first-class one there. A Woodville correspondent, under a late date, sends us the following: Samuel Rush and son have struck good diggings on Evans creek. They picked up a piece recently that weighed \$650. John W. Robinson and Jesse Tyler of Sardine creek have put a pipe on their diggings and have done considerable work, considering the unfavorable season. They are gentlemen of enterprise and merit success.

UTAH.

REVIEW.—*Salt Lake Tribune*, March 25: The product of the week has been fair, and the usual activity characterizing the spring business begins to appear. There is less talk of the Cœur d'Alene country than for some time past, and a general opinion prevails that it would be better to wait for more definite information from there, and for some actual output of the mines. The bullion receipts in this city for the first three months of the present year, excluding the receipts of ore, were as follows: January, \$449,228.75; February, \$364,606.47; March, \$460,366.60. Total, \$1,274,201.81. The receipts of bullion in this city for the week ending April 2, inclusive, were \$112,455.92; of ore, \$8,820; of both, \$121,275.92. The receipts of the previous week were \$123,754.77, of which \$118,394.77 was bullion. The shipments from Salt Lake for the week ending March 29th, inclusive, were as follows: 36 cars bullion East, 908,598 lbs.; 1 car lead West, 24,881 lbs. Total, 37 cars, 933,479 lbs. The product of the Horn Silver for the week amounted to fifteen cars of bullion, valued at \$45,000, bringing the total product for the present year up to \$531,000. We notice that on the 2d inst. Horn Silver stock touched \$8 in New York. The Ontario shipped during the week thirty-eight bars of bullion, of the value of \$41,825.92. Total product for 1884 to date, \$428,569.67. The Crescent shipped during the week three lots of ore, aggregating \$8,820 in value. The storms and bad roads have materially interfered with the operations of this company, but it will doubtless be in fine shape before the next stormy season sets in. The Stormont sent up two bars of silver, \$2,910. The product of the Hanauer smelter for the week amounted to eight cars of bullion, \$16,900. The Vienna of Sawtooth sent down one shipment of bullion during the week, of four bars, valued at \$5,820. The Silver Mountain mine of Big Cottonwood has begun shipping ore again. The tunnel and shaft having been connected by an upraise, the mine now has good air and work is being pushed forward vigorously. The New Emma property at Alta is being cleared around the mouth of the tunnel, of the debris of the snowslide, and as soon as supplies can be sent up work will be resumed in drifting to the ledge.

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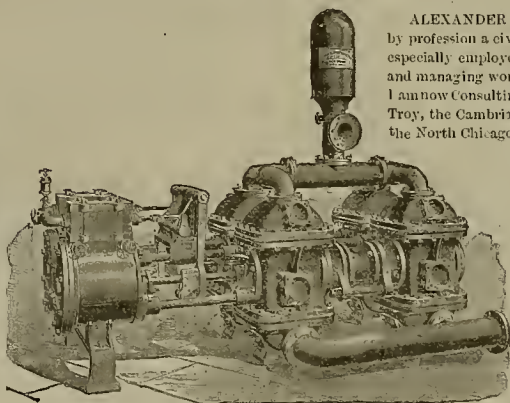
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Ingersoll, D2 3", beat Rand 3 1/2".....	.744	" "
Ingersoll, D2 3", beat National 3 1/2".....	.505	" "
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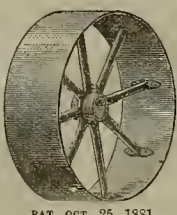
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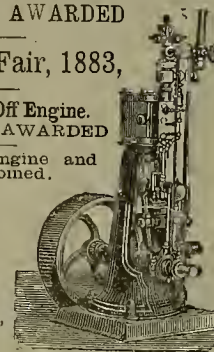
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For working gold and silver ores by wet or dry crushing. The Stetefeldt, Howell's Improved White, Branton's & Bruckner Furnaces, for working base ores. Rotary Dryers, Stetefeldt Improved Dry Kiln Furnaces.

SMELTING FURNACES,

Water Jackets, either Wrought or cast Iron, made in sections or one piece, either round, oblong, oval or square. Our patterns most extensive in use. **SPECIAL FURNACES FOR COPPER SMELTING.** Slag Pots and Cars, Improved form. Bullion and Copper Moulds and Ladles, Litharge Cars and Pots, Cupel Furnaces and Cars.

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Large or Small for flat or round rope. Double Cylinder Engines, from 6x10 to 18x60. This latter size furnished J. B. Hagglin or Olant and Old Abe Co., Black also Corliss Pumping Engines, 26x60, for hoisting and Pumping Works, for 2,000 feet deep. Baby Hoists for Prospecting, 4 H. P. to 6 H. P.

Wire Rope, Safety Cages and any Size and Forms of Cars.

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Frue Ore Concentrator, or Vanner Mills.

Coarse Concentrating Works, Improved Jigs, Crushing Rollers, Sizers, Trommels, Rittenger Tables, and adjuncts for the proper working of Gold, Silver and Copper Ores, complete in every detail. **HALLIDIE IMPROVED ORE TRAMWAY.** We refer to Gen. Custer mine, Idaho, 5,000 feet Columbus Mine, Col., 4,760 feet long; Mary Murphy mine, Col., 5,000 feet long, all in constant operation.

LEACHING MILLS,

Improved Corliss and Plain Slide Valve Meyer's Cut-off Engines.

CORLISS ENGINES from 12x36 Cylinders to 30x60. PLAIN SLIDE VALVES from 6x10 to 36x36. of every form, made of Pine Iron Works C. H. No. 1 Flange Iron, or Otis Steel. Workmanship the most careful. Rivets Hand Driven.

McCaskell's Patent Car Wheels and Axles—Best in Use.

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Pacific Rolling Mill Co.,

SAN FRANCISCO, CAL.

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RAILROAD AND MERCHANT IRON,

ROLLED BEAMS, ANGLE, CHANNEL AND T IRON, BRIDGE AND MACHINE BOLTS, LAG SCREWS, NUTS WASHERS, ETC., STEAMBOAT SHAFTS, CRANKS, PISTONS, CONNECTING RODS, ETC., ETC.

Car and Locomotive Axles and Frames, and Hammered Iron of Every Description.

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Orders Solicited and Promptly Executed.

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MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others. It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.
No. 2 is superior to any powder of that grade.

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 SAWING, PLANING AND GENERAL
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To Architects and Builders.

Valuable Vault for Sale at a Bargain

A contractor has a thoroughly burglar-proof vault for sale. Dimensions, 4½x5 ft.; height, 7 ft. in the clear; weight, about 6,000 lbs. In perfect order throughout. Double doors inside. Single burglar-proof outside door, 1½ inch steel and iron combined. The bolt work is of superior and first-class quality in all respects, there being no better on this coast. Can be examined at any time. Write for further information. Address P. M., box 2361, S. F. P. O., or inquire at this office.

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Philadelphia Chemical Stoneware Manufactory,

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Manufacturer of all kinds of Chemical Stoneware — FOR — Manufacturing Chemists. Also Chemical Bricks for Glover Tower.

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VULCAN B B AND AJAX,

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

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California Wine Cooperage Co.




FULDA BROS., Proprietors,
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ALL KINDS OF CASKS, TANKS,
 SHIP, MINING, and WATER TANKS a Specialty.

San Francisco Pioneer Screen Works

J. W. QUICK, MANUFACTURER.



Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the Coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

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The California Perforating Screen Co.
 All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for flour and other mills. **BOOK & WAGNER,**
 123 and 125 Beale St., S. F.

QUICKSILVER.

THE CELEBRATED A BRAND.

Shipped Direct from the New Almaden Mine,
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 [P. O. Box, 2548.]

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TO BUY—A MINING PROPERTY. California gold quartz preferred. Don't want mine to stuck, but to work as an individual enterprise. Prefer to own property alone, but might take a mine to develop for a controlling interest.

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 Care Mining and Scientific Press.

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Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

William Hawkins.

(SUCCESSOR TO HAWKINS & CANTRELL.)

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Manufacturer of

IMPROVED PORTABLE HOISTING ENGINES,

FOR MINING AND OTHER PURPOSES.

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Steam Engines and all Kinds of Mill and Mining Machinery.



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MANUFACTURERS OF

STEAM ENGINES AND BOILERS.

Carry Engines and Boilers in Stock for Immediate Delivery.

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IRRIGATING MACHINERY.

STEAM PUMPS TO GO IN SHAFTS.

NO ENGINES OR BELTS. NO PUMP VALVES.

PRICE OF PLANT REDUCED ONE-THIRD.

SAN FRANCISCO TOOL COMPANY, - - 11 Stevenson Street, S. F.

List of U. S. Patents for Pacific Coast Inventors.

(From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 262 Market St., S. F.)

FOR WEEK ENDING APRIL 1, 1884.

295,969.—AIR AND DUST SEPARATOR—J. P. Anderson, S. F.
296,272.—CRANK—J. H. Burks, Los Angeles, Cal.
295,998.—GATE OR VALVE—P. Giovannini, S. F.
295,920.—MITER GAGE—E. Hipolito, San Jose.
295,031.—FAUCET—H. Matullath, S. F.
296,035.—DOOR AND PANEL WORK—W. N. Miller, Oakland.
296,052.—ROCK DRILL—W. E. Peyton, S. F.
296,054.—KNIFE AND PEN HOLDER—Isaac Phillips, Silver City, I. T.
296,066.—GREEN CORN CUTTING MACHINE—Geo. W. Roberts, Walla Walla, W. T.
296,075.—ORE SEPARATOR—L. A. Shead, Alameda, Cal.
295,992.—ORE SEPARATOR—L. A. Shead, Alameda, Cal.
295,993.—ORE SEPARATOR—L. A. Shead, Alameda, Cal.
296,255.—LAMP COLLAR—A. D. Vest, San Jose.
296,092.—SLATE WASHER—H. L. Weed, Grass Valley, Cal.
296,166.—METALLIC FASTENING—Harris H. Suisun, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

BALING PRESS.—John D. Page, Sanders, Fresno Co. No. 295,672. Dated March 25, 1884. This invention relates to a new and useful baling press, and to certain improvements herein, consisting in a peculiar screw-shaped feeder and compressor, and in a guiding follower against which the feeder constantly presses the material until baled. The object of the invention is to provide a baling press in which the material shall be fed to good advantage, and be subjected to pressure throughout the entire operation, whereby a better and firmer bale may be made; and further, to make an effective and economical device. The material is fed in through apertures, and the feeder being revolved, it twists and feeds it down into the chamber against the spring follower, which is held continuously against it. As more material is screwed in by the compressor the follower recedes, and naturally its pressure increases until the bale is well packed and is ready for discharge through the side or top.

COUPLING FOR CAR-HEATING APPARATUS.—John J. Lacey, S. F., assignor to Lacey Automatic Coupling Co., Oakland. No. 295,255. Dated March 18, 1884. This invention relates to a means for heating cars from a detached or distant source of supply without the presence of fire in the cars, and it consists principally of a joint or coupling for pipes, extending beneath the cars, so constructed as to be automatically connected, and a passage opened throughout the whole length whenever two cars come together, and are coupled, thus enabling the inventor to convey steam, hot air or other suitable medium into heaters placed in each car throughout the train. The hot air or steam is conveyed from the engine, or a special source.

MACHINE FOR CASTING LEADS ON FISH NET LINES.—Erick Manula, Astoria, Oregon. No. 295,262. Dated March 18, 1884. This invention relates to a new and useful machine for casting the leads or sinkers on the lines which go to form fish nets; and it consists in a peculiar reel or winch upon which the line is wound, and having its circumference constructed to form one-half the matrix in which the line lies, and a projecting arm under which the reel passes forming the other half. It consists, also, in the means for conducting the molten metal into the matrix and cutting it off, and the means for clamping the two parts together during the casting.

BOILER SCRAPER.—Joseph Beare, Tombstone, Arizona. No. 295,854. Dated March 25, 1884. This boiler scraper consists in one or more frame sections having internally-serrated annular bands surrounding the tube, and radiating toothed wings for scraping the interior of the shell, and means for reciprocating said section or sections within the boiler. It consists further in details of construction whereby the tube scrapers may be rendered expanding, to enable them to move readily, and by which the shell scrapers may pass the rivets and seams of the interior.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walked with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

The Silk Floss Mattresses and Pillows manufactured by the California Furniture Manufacturing Company, 226 Bush street, are the best substitutes yet discovered for the e made of curled hair or feathers. They are in many respects far superior to either, yet they are much cheaper. To use them is a luxury. Try them, and you will be satisfied.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S. M. Co.	Nevada.	23.	50.	Mar 27.	May 22.	W. H. Watson.
Alpha Hydraulic M. Co.	California.	5.	25.	Jan 25.	Apr 25.	P. M. Scott.
Belle Isle M. Co.	Nevada.	7.	20.	Mar 12.	Apr 17.	J. W. Pew.
Belmont M. Co.	Nevada.	36.	75.	Feb 20.	Apr 30.	J. W. Pew.
California M. Co.	Nevada.	11.	20.	Mar 14.	Apr 21.	C. P. Gordon.
Champion M. Co.	California.	14.	07.	Mar 7.	Apr 10.	Theo. Wetzel.
Con Virginia M. Co.	Nevada.	20.	20.	Mar 12.	Apr 16.	A. W. Haves.
Cueva Santa M. Co.	Mexico.	1.	5.	Mar 4.	Apr 7.	O. M. McLane.
Daisy Cement M. Co.	California.	1.	2.	Mar 27.	May 1.	C. J. Collins.
Diana G. M. Co.	Nevada.	5.	10.	Mar 5.	Apr 9.	P. J. Flanagan.
Excelsior Water Co.	California.	6.	50.	Jan 29.	Apr 15.	H. B. Wheaton.
El Dorado M. Co.	Nevada.	2.	08.	Mar 6.	Apr 9.	J. H. Sayre.
Elko Con. M. Co.	Nevada.	3.	15.	Mar 4.	Apr 8.	F. Sperling.
Gould and Curry M. Co.	Nevada.	47.	80.	Mar 7.	Apr 10.	A. R. Durbin.
Grand Prize M. Co.	Nevada.	15.	25.	Feb 29.	Apr 3.	E. M. Hale.
Gorilla M. Co.	Cal.	3.	15.	Feb 27.	Apr 31.	A. A. Enquist.
Independence M. Co.	Nevada.	13.	20.	Mar 12.	Apr 16.	J. W. Pew.
Indian Spring Drift M. Co.	California.	1.	30.	Feb 13.	Apr 22.	A. B. Paul.
Justice M. Co.	California.	49.	10.	Mar 10.	Apr 13.	R. E. Kelly.
La Grange Ditch and M. Co.	California.	8.	50.	Mar 31.	May 5.	C. Halsey.
Lady Washington M. Co.	Nevada.	4.	10.	Apr 4.	May 9.	W. H. Watson.
Lake County Quartz M. Co.	California.	8.	123.	Mar 4.	May 16.	A. A. Baird.
Lorito M. Co.	Mexico.	6.	50.	Feb 23.	Mar 28.	H. G. Jones.
Murphy M. Co.	California.	5.	15.	Mar 31.	May 8.	W. Letts Oliver.
Morgan M. Co.	California.	10.	60.	Feb 27.	Apr 7.	C. L. Tilden.
Mammoth Bar M. Co.	California.	5.	15.	Mar 14.	Apr 18.	J. W. Pew.
Milton M. Co.	California.	1.	1.00.	Feb 14.	Mar 24.	H. Pichior.
Mayflower Gravel M. Co.	Cal.	23.	10.	Mar 3.	Apr 7.	A. B. Paul.
North Gould & Curry M. Co.	Nevada.	6.	25.	Feb 29.	Apr 2.	C. H. Mason.
Ophir M. Co.	Nevada.	47.	1.00.	Apr 3.	May 6.	E. B. Holmes.
Puget Sound Iron Co.	Washington.	7.	1.00.	Mar 12.	Apr 25.	A. Halsey.
Pedro Corp M. Co.	Arizona.	1.	6.	Feb 23.	Apr 7.	J. Stadfeldt.
Pleasant Valley M. Co.	Cal.	3.	10.	Mar 3.	Apr 7.	A. B. Paul.
Peerless M. Co.	Arizona.	1.	25.	Apr 8.	May 17.	J. G. Wells.
Savage M. Co.	Nevada.	59.	50.	Apr 5.	May 9.	E. B. Holmes.
Union Con. M. Co.	Nevada.	26.	1.00.	Mar 6.	Apr 8.	J. M. Buffington.
Utah S. M. Co.	Nevada.	45.	1.00.	Mar 21.	Apr 23.	J. G. Pratt.
Wildman M. Co.	California.	1.	25.	Feb 12.	Mar 28.	R. Elton.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Columbus Con. M. Co.	Nevada.	J. M. Buffington.	309 Montgomery st.	Annual.	Apr 17
Tigon Con. M. Co.	California.	G. W. Sessions.	309 Montgomery st.	Annual.	Apr 14

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M. Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Apr 15
Bodie Con. M. Co.	California.	G. Sessions.	309 Montgomery st.	50.	Apr 5
Bulwer Con. M. Co.	California.	W. Letts Oliver.	309 Montgomery st.	10.	Jan 15
Chollor Con. M. Co.	California.	D. C. Bates.	309 Montgomery st.	25.	Jan 12
Derbec Blue Gravel M. Co.	California.	T. Wetzel.	522 Montgomery st.	10.	Mar 15
Idaho M. Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Apr 2
Jackson M. Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar 16
Kentuck M. Co.	Nevada.	J. W. Letts Oliver.	309 Montgomery st.	10.	Apr 15
Paradise Valley M. Co.	Nevada.	W. Letts Oliver.	309 Montgomery st.	10.	Mar 20
Standard Con. M. Co.	California.	Wm. Willis.	309 Montgomery st.	25.	Mar 12
Silver King M. Co.	Arizona.	J. Nasb.	315 California st.	25.	Dec 15
Syndicate M. Co.	California.	J. Stadfeldt.	419 California st.	10.	Apr 5

Mining Share Market.

The mining stock situation remains about the same, dullness continuing to prevail. Unless they strike something remarkable at Bodie, or on the Comstock pretty soon, the mining share market will drop out of sight altogether. In the latter place, at the north end, prospecting has been commenced on the 1950 level of the Utah, where there is a good deal of ground that has never been explored.

In the Sierra Nevada the main north-east drift on the 3100 level is still going ahead in vein material that shows frequent streaks of quartz of a favorable character. As yet no crosscutting has been done in this part of the mine.

In the California and Consolidated Virginia the drift on the 2700 is making good progress. When it connects with the main east drift it will give a circulation of air that will allow of the prospecting of a large area of ground.

All is going on well in the middle mines. Connection will soon be made between the southeast drift on the 2800 level of the Hale and Norcross and the main west drift from the Combination shaft. This connection will give a circulation of air which will allow of extensive prospecting operations in the Chollar and Potosi as well as the Hale and Norcross.

At Gold Hill all the leading mines are extracting ore of a good quality and the mills on the river are kept going to their full capacity.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Bullion Shipments.

Horn Silver, April 2, \$21,000; Crescent, \$2,570; Hanauer, \$5,500; Horn Silver, \$5,000; Ontario, \$3,14,039; Horn Silver, \$5,000; Ontario, \$4,870; Stormont, \$4,630; Crescent, \$1,600; Hanauer, \$4,470; Horn Silver, \$5,000; Ontario, \$5,976; Hanauer, \$5,000; Crescent, \$1,750; Ontario, \$3,348; Horn Silver, \$5,000.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. A. BARTLETT—Sacramento county.
A. S. DENNIS—San Mateo county.
A. C. KNOX—Yolo and Napa counties.
Wm. R. McQUINN—Tulare county.
T. H. MERRY—San Bernardino, Ventura and Santa Barbara counties.
C. D. McFARLANE—Sacramento county.
JOHN H. STURGE—Santa Clara county.
B. W. CROWELL—Merced and Stanislaus counties.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 20.	WEEK ENDING Mar. 27.	WEEK ENDING Apr. 3.	WEEK ENDING Apr. 10.
Alpha.	1.30	1.50	1.30	1.50
Alta.	1.50	1.70	1.00	1.53
Addes.	.25	.30	.25	.30
Argentina.	.85	.95	.85	1.10
Belcher.	.25	.26	.25	.26
Best & Belcher.	.25	.26	.25	.26
Bullion.	.65	.70	.60	.55
Bonanza King.	.20	.20	.15	.20
Bodie Isle.	.80	.70	.75	.80
Bodie Con.	.30	.40	.30	.35
Benton.	1.60	2.25	1.20	1.75
Bulwer.	.10	.20	.05	.05
California.	.10	.20	.05	.05
Challenge.	.10	.20	.05	.05
Chollor.	.55	1.60	1.20	1.45
Consolidated.	.10	.10	.10	.10
Con. Imperial.	.10	.20	.10	.10
Con. Virginia.	.45	.50	.40	.45
Con. Pacific.	.45	.50	.40	.45
Crown Point.	1.00	1.10	1.00	1.20
Day.	2.00	2.00	2.00	2.00
Eureka Con.	8.50	4.50	4.10	4.25
Eureka.	.30	.30	.20	.25
Exchange.	.30	.30	.20	.25
Grand Prize.	.05	.05	.05	.05
Gould & Curry.	1.25	1.30	1.15	1.20
Goodlaw.	.45	.55	.30	.45
Hale & Norcross.	1.15	1.70	1.30	1.40
Hale & Norcross.	1.60	1.75	1.60	2.50
Holmes.	.10	.15	.10	.15
Independence.	.10	.15	.10	.15
Julia.	.10	.15	.10	.15
Justice.	.10	.15	.10	.15
Martin White.	.10	.15	.10	.15
Mono.	1.90	2.50	1.70	2.10
Mexican.	1.65	1.95	1.50	1.70
Mt. Diablo.	.20	.25	.20	.25
Northern Belle.	.45	.50	.40	.45
Navajo.	2.45	2.90	2.65	2.80
North Belle Isle.	.15	.20	.10	.15
Occidental.	.10	.15	.10	.15
Ophir.	1.60	1.95	1.50	1.70
Overman.	.30	.30	.20	.25
Potosi.	.60	1.00	.70	.90
Pinal Con.	.90	1.00	.80	.90
Savage.	.90	1.00	.80	.90
Seg. Belcher.	.25	.30	.25	.30
Sierra Nevada.	.25	.30	.25	.30
Silver Hill.	.05	.05	.05	.05
Silver King.	.35	.40	.30	.35
Scorpion.	.35	.40	.30	.35
Syndicate.	.80	.90	.70	.80
Tigra.	1.65	2.00	1.50	1.75
Union Con.	1.20	1.45	1.00	1.20
Utah.	1.75	2.25	1.90	2.40
Yellow Jacket.	1.75	2.25	1.90	2.40

Sales at San Francisco Stock Exchange

THURSDAY A. M.	APR. 10.	50	UTAH.	85c
630 Alta.	1.10@1.15	10	Yellow Jacket.	1.95
200 Andes.	.20c	40	AFTERNOON SESSION.	
370 Bodie Con.	.35	40	Alta.	1.10
100 Belle Isle.	.15c	150	Andes.	.20@.25c
250 Belcher.	1.00	20	Bodie.	.30
50 B. & Belcher.	.25	50	Bulwer.	.65c
200 Bulwer.	.75c	40	B. & Belcher.	.225
400 Bunker.	.80	80	Chollar.	.15c
300 Crown Point.	1.35	40	Belle Isle.	.15c
600 Chollar.	1.01.05	150	Crown Point.	1.40
25 Con. Virginia.	.05c	100	Con. Virginia.	.06c
200 Day.	.10	150	Gould & Curry.	1.45
35 Gould & Curry.	.60	100	Hale & Norcross.	1.10@1.15
300 Mono.	1.15	250	Justice.	.20c
50 Navajo.	2.45	1000	Mono.	1.10@1.15
430 Ophir.	.65c	275	Navajo.	.50c
200 Potosi.	.80c	810	Ophir.	.75c
50 Syndicate.	.55c	200	Potosi.	.50c
60 Sierra Nevada.	1.90	15	Sierra Nevada.	1.95
300 Savage.	.40c	300	Union.	2.10@2.15
650 Union Con.	2.2@2.05	50	Yellow Jacket.	1.95

Don't Fail to Write.

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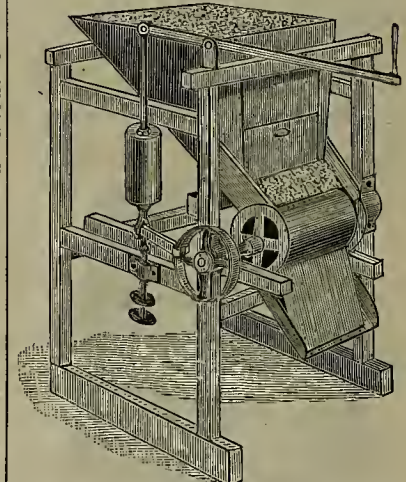
(WHOLESALE.)

THURSDAY, April 10, 1884.

ANTIMONY—Per pound.	14 @	5
IRON—American Pig, soft, ton.	28 @	00
Scotch Pig, ton.	24 @	00
American White Pig, ton.	— @	—
Oregon Pig, ton.	— @	—
Upper Cap, Nos. 1 to 4.	— @	—
Remed Bar.	5 @	3
Horseshoes, keg.	7 @	7
Nail Rod, according to thickness.	14 @	15
2x2—English Cast, lb.	14 @	15
Black Diamond, ordinary sizes.	15 @	16
Drill.	12 @	14
Machinery.	22 @	22
COPPER—Ingot.	33 @	3
Braziers' sizes.	4 @	—
Fire-box sheets.	12 @	—
Nails.	17 @	—
Bolt.	23 @	—
Old.	8 @	—
Bar.	— @	—
Lead—Pig.	12 @	—
Cement, 100 lbs.	4 @	4
Bar.	5 @	6
Pipe.	7 @	—
Sheet.	8 @	—
Net discount 10% on 500 bags: Drop, 7 bag.	2 @	—
But, 3 bag.	2 @	—
Chilled, do.	2 @	—
TIN PLATES—Charcoal.	6 @	6
Coke.	5 @	5
Bacon Tin.	21 @	—
Australian.	21 @	—
I. C. Charcoal Roofing, 14x20.	6 @	6
ZINC—By the cask.	19 @	—
Sheet, 7x3 ft. 7 to 10 lb. less the cask.	9 @	10
N. Is.—Assorted sizes.	3 @	3
QUICKSILVER—By the flask.	34 @	34
Flasks, new.	1 @	1
F. ks, old.	25 @	—

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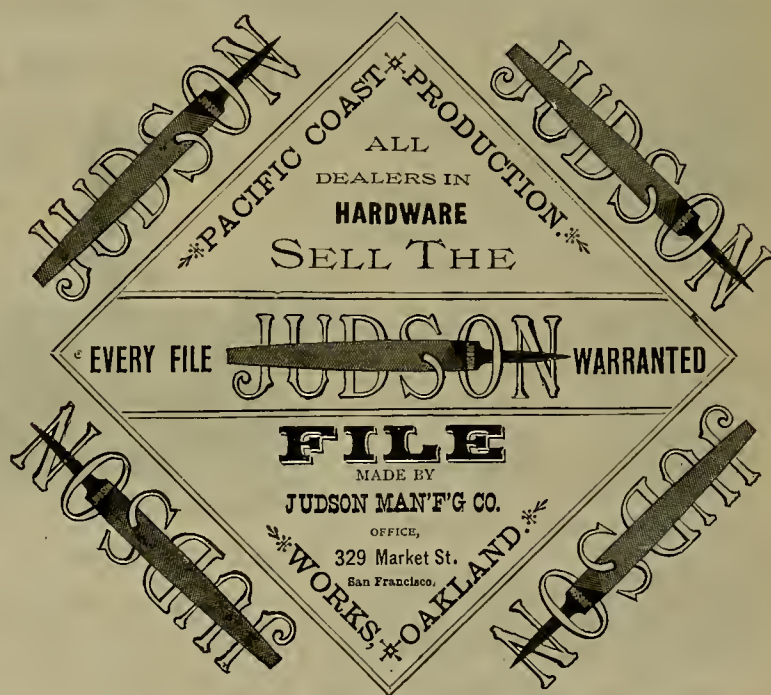
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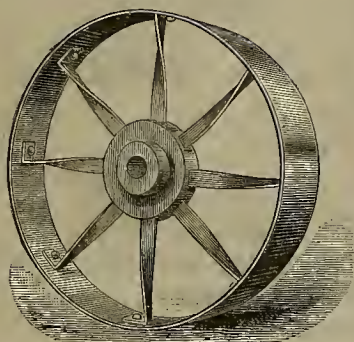
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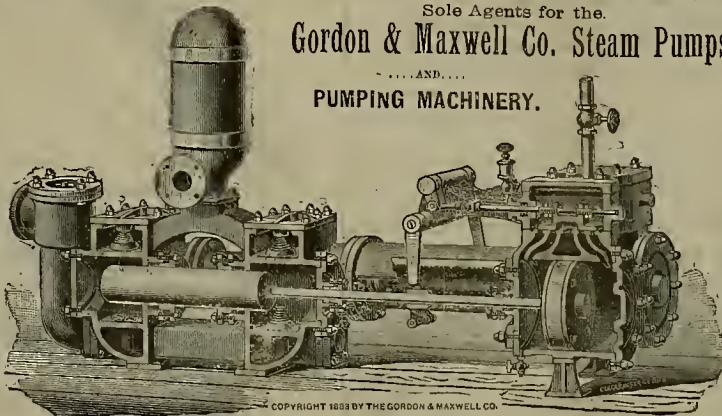
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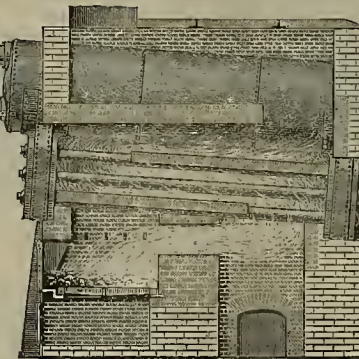
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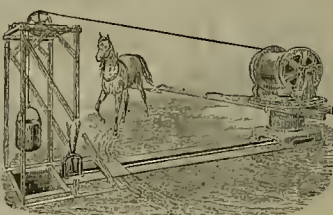
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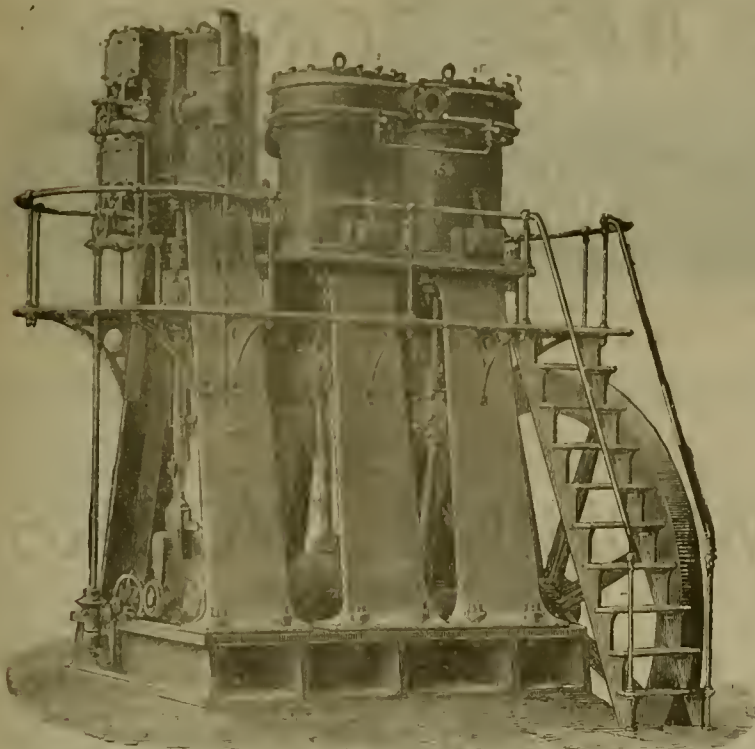
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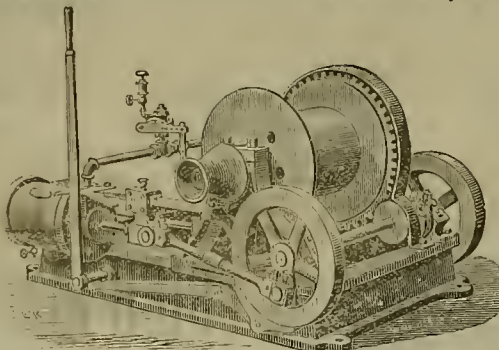
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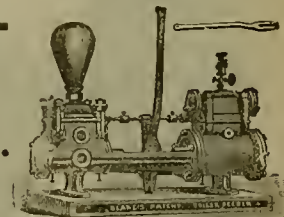
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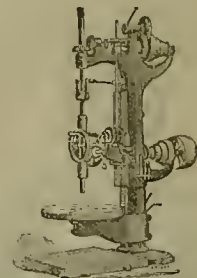
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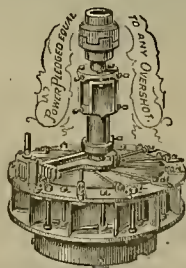
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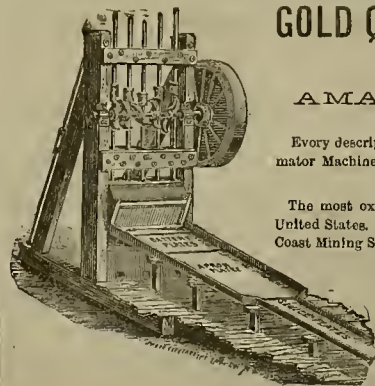
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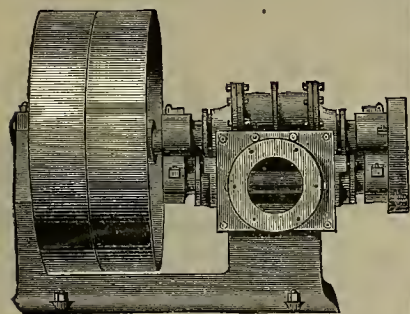
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Wilbraham Rotary Piston Pumps.



The best pump in the United States for irrigating purposes, and will do an equal amount of work with one-third the power of any other pump.

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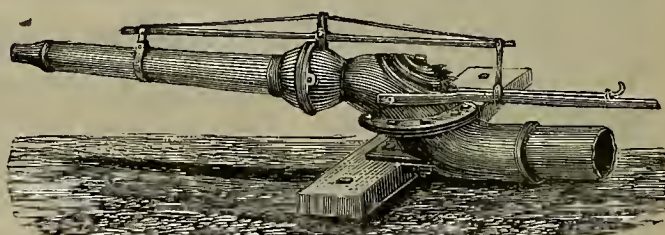
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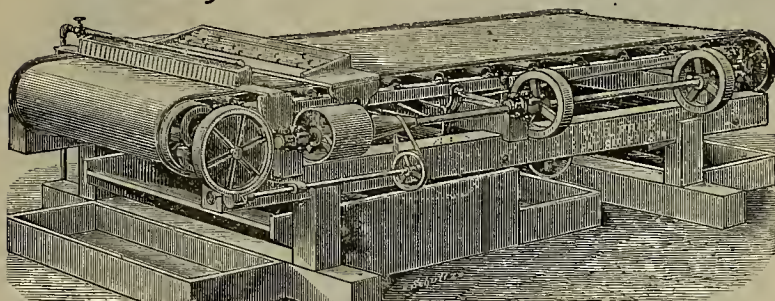
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Hydraulic Mining Machinery of every Description.

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THE FRUE ORE CONCENTRATOR, OR VANNING MACHINE.

OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the office of Huckleley, Spiers & Hayes, No. 220 Fremont Street, San Francisco.

To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co..

Room 7—No. 109 California Street, - - - - - SAN FRANCISCO, CAL.
January 3, 1884.

J. MACDONOUGH.

J. C. WILSON.

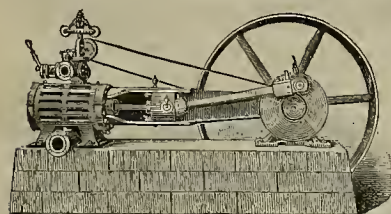
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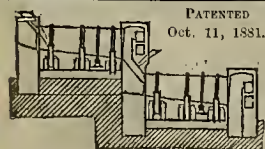
Heavy Automatic and Slide-valve Engines,

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SOLE AGENTS FOR THE

Skinner & Wood Portable Engines and Boilers

PATENTED
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FURNACE.

Working up to 93 per cent. of Fire Assay, using 25 per cent salt since July, 1882. LICENSES FOR USE FOR SALE, or FURNACES CONSTRUCTED. Address R. A. NEVIN, Patentee, ELGIN IRON WORKS, 217 Fremont St., San Francisco, Cal.

ALL INFRINGEMENTS PROSECUTED.

POWDER! POWDER! POWDER!

A New Explosive!!

MORE POWERFUL THAN NITRO-GLYCERINE,

And Warranted Perfectly Safe.

THE VAN CAMPEN COMPOUND!

THE SAFEST AND BEST EXPLOSIVE IN THE WORLD!

H. D. VAN CAMPEN, the patentee, has been at work for many years to accomplish the work of inventing an explosive that would compete with nitro-glycerine and yet be safe to handle. He has finished his undertaking, and today has upon the market the safest and best explosive in the United States. We defy any explosive on trial to make us take back the above statement. Any person taking exceptions to our statements we will meet on trial, IN ANY KIND OF BLASTING.

FOR RAILROAD WORK, QUARRY WORK, OR MINING

Nothing can Compete with the Van Campen Compound.

It may be cut in pieces, stamped on the ground, jammed around, set on fire and burned up, and no explosion. REMEMBER ITS SAFETY. We will leave the buyer to be the judge, and by testing will prove all we claim. For Sale in car-load lots direct to the trade. PRICES LOW AND GOODS WARRANTED. Anyone wishing Compound, or further instructions, should correspond with

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General Agent for all Territories West of East Line of Colorado,
12 CALIFORNIA ST., SAN FRANCISCO, CAL.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 19, 1884.

VOLUME XLVIII
Number 16.

Underground Hydraulic Pumps.

At a recent meeting of the Mining Institute of Scotland, Mr. Robert Thomas Moore, a brother of the accomplished mechanical engineer Mr. Joseph Moore, of the Kieldon Iron Works in this city, read a paper on "An improved arrangement for working underground pumps by means of hydraulic pressure." The arrangement described was a form of pumping by hydraulics, advantage being taken of the fact that water is practically incompressible, and that if a pipe of any length be filled with water, a piston placed at one end will, if pushed forward, propel a piston placed at the other in the same direction. The leading ideas are: (1.) That the water confined in the pipe shall be pressed at not less than 1,000 lbs. per square inch, so that the plungers and pipes may be of small diameter. (2.) That there shall be a connection between the two mains, to do away with shocks. (3.) That the height of any lift may be 300 fathoms. (4.) That while the water in the plunger may travel at any speed from 80 feet to 100 feet per minute, the speed of the water in the pipes may be 300 feet per minute.

These preliminary remarks introduced the description of the system, which is the invention of Mr. Joseph Moore of San Francisco, and which has been applied at several places on this coast. The system is suitable for all the three classes of pumps. (1.) For pumps placed at the bottom of a vertical shaft. (2.) For pumps placed inside the workings. (3.) For sinking pumps. In all these cases the steam engine is placed at any convenient position on the surface. The advantages claimed for the system are: Its extreme simplicity; there being no valves employed, except the clacks of the pumps. The facility with which it can be applied at any distance from the engine. The small space which it occupies, in consequence of the high pressures used. There is no danger of fire, nor any heat from steam pipes. The engine on the surface can be much better looked after than if it were underground. It can be started although covered with water; and, if it is a sinking lift, can be raised up to the surface, if necessary. As compared with an engine working with pump rods, there is the entire absence of pump rods. From careful experiments it has been found that the friction due to the power pipes, and the power and water plungers, with properly constructed pipes and stuffing boxes, does not exceed 11 per cent, which is much less than the friction in pump rods.

Technical Society of the Pacific Coast.

The adjourned meeting of this new association was held in the Patent Room of the Mechanics' Institute on Saturday evening last, Mr. Specht in the chair. Mr. George Parry, chairman of the Committee on By-Laws, read those framed by the committee, which were, on motion of Mr. Allardt, adopted. It was announced that the total number of charter members who had signed the roll was 126. Of these there were 61 civil engineers, 30 mechanical engineers, 12 mining engineers, 11 architects, 6 chemists and metallurgists, 4 surveyors and 2 patent attorneys.

In order to perfect the organization, it was re-

Jones, Bowie, Molera, Hall and Percy were declared elected. It was intended that the professions should be represented as far as possible on the board, but the votes on the mechanical engineers having been divided, none of them were elected. Of the other professions, only a single candidate for each was nominated.

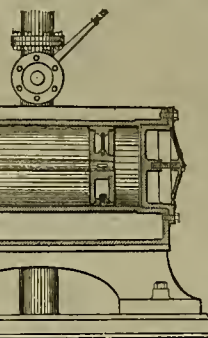
The full list of officers is therefore as follows: President, Col. Geo. H. Mendell, U. S. A.; Vice President, Geo. J. Specht, C. E.; Secretary, Charles G. Yale; Treasurer, Joseph Crockett; Directors, W. Hammond Hall (State Engineer); Aug. J. Bowie, Jr., M. E.; E. J. Molera, Major Wm. A. Jones, U. S. A., and Geo. W. Percy.

Some discussion ensued on the advisability of

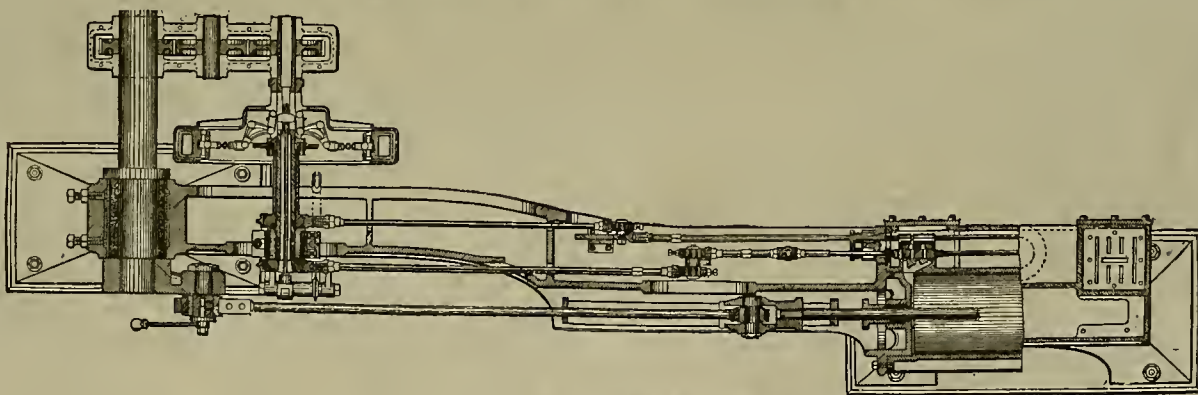
The Cummer Engine.

An invitation having been extended to us, among others, to critically examine the practical working operation of one of the "Cummer" engines, constructed by the Cummer Engine Company, of Cleveland, Ohio, and recently placed in the Joshua Hendy Machine Works, at No. 49 and 51 Fremont street, in this city, who are the agents for their sale on this coast, we availed ourselves of the opportunity, and herewith present a cut illustrating the plan and elevation of these celebrated engines, which are meeting with extensive favor in the Atlantic States, this being the first of this special style or form of automatic engine

placed in operation here. These engines are constructed with a view to ensuring economy in the simplicity of mechanism, accessibility of parts, lubrication, adjustment for wear, excellence of workmanship and solidity, and elegance of form. Their simplicity of mechanism consists in the fact that, wherever it could be safely done, their builders have reduced to the fewest possible number of parts the train of mechanism designed for operating the cut-off, without neglecting, however, to combine in their construction those parts which are not only essential but advantageous to the use of steam. With regard to the accessibility of their parts, everything movable is in plain sight, and all parts requiring adjustment are within easy reach with ordinary



SECTIONAL VIEW OF THE CUMMER ENGINE.



PLAN OF CUMMER ENGINE.

solved first to elect a permanent Secretary. On motion of Major Jones, Mr. Chas. G. Yale, editor of the MINING AND SCIENTIFIC PRESS, was elected to the position. Mr. Allardt, in quite a complimentary speech, nominated for President, Col. George H. Mendell, U. S. A., and the Secretary was instructed to cast a ballot in his favor. On motion of Major Jones, Mr. George J. Specht, C. E., was nominated for Vice President, the gentleman having been mainly instrumental in organizing the society. The Secretary was instructed to cast a ballot for Mr. Specht. On motion of Mr. Yale, Mr. Joseph Crockett, engineer and Superintendent of the S. F. Gaslight Co., was nominated for Treasurer, and the Secretary was instructed to cast a ballot for the candidate.

The following nominations for Directors were made: W. Hammond Hall, C. E.; Aug. J. Bowie, Jr., M. E.; George W. Percy, architect; E. J. Molera, electrician; F. Gutzkow, chemist and metallurgist; G. W. Diokie, mechanical engineer; J. Spiers, mechanical engineer; Patrick Noblo, mechanical engineer; Major Wm. A. Jones, military engineer; W. G. Curtis, railroad engineer.

The result of the ballot was that Messrs.

the Association becoming a branch of the Mechanics' Institute in some manner so as to have the benefit of the library. There was much diversity of opinion, but it was determined to keep an independent organization.

The Secretary was instructed to have the Constitution, by-laws and list of members printed, and a copy sent to each member.

A vote of thanks to the Mechanics' Institute for the use of its rooms was passed, and the meeting adjourned to the first Thursday in May, when active work will be commenced.

THE mining outlook for Utah is brighter than it has been for some time. Ophir and Stockton give promise of some life, while Bingham prospects are looming up big. Tintie, American Fork and Big Cottonwood districts will send down lots of ore this season.

MR. GEORGE McDOWELL is about to visit the different camps and towns in Amador and Calaveras counties, in the interest of the MINING AND SCIENTIFIC PRESS and other publications of Dewey & Co. We bespeak for him a cordial reception.

tools. In the matter of lubrication of the wearing surfaces, the distribution of oil is very complete, and improved devices for oiling the valves and piston have been introduced.

The wearing surfaces are not only ample for service required, but are provided with means of adjustment in the event of wear. They are constructed with the view of producing not only a strong and well-proportioned engine, but at the same time to give it a graceful outline, preserving, as far as possible, those curves which are pleasing to the eye, rather than the rigid outlines which are the result of connecting straight lines, yet not forgetting that though "the curved line is the line of beauty, the straight line is the line of duty."

The engine now in operation at the Joshua Hendy Machine Works has thirteen inches diameter of cylinder and twenty-four inches stroke of piston, and the agents invite an examination of its merits and the economy of its use: this form having been especially designed and adapted for electric lighting, flour, cotton and woolen mills, and all other purposes where perfect steadiness of motion, uniformity of action and the economical use of steam may be required.

DURING the past winter 87½ inches of rain fell in the Cajon Pass.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Siskiyou County Mines.

EDITORS PRESS:—As far as we can judge the future by the past and present, the season promises to be one of the most prosperous for the county. We anticipate good outside feed, good crops, and a good yield of filthy lucre from the mines. Nearly all the old mines promise well, while there will be a large area of new mining ground worked this season. The mining and stock outlook is especially good.

Perhaps a short sketch of some of our mining territory might be of some interest to your readers. The writer is not well enough informed regarding the mines of the whole county to give more than a very meager notice of them. I am engaged in this business on a small scale, though with good hopes and fair prospects of at least making "grub," especially as I raise all my "spuds," beans, corn and small vegetables, keep my chickens, milch cow and gun. The latter, in the provision line, is a host within itself.

There are small claims on every side of me. Two miles north are the French Creek quartz and placer mines, with a \$3,000 five-stamp quartz mill, arastra, long string of hydraulic pipe, etc. Cory's quartz claims were surveyed about two weeks ago, for the purpose of being patented. I would like to see these quartz claims (the French Creek) get into the hands of men that are able to prospect them. The present owners, Hartstrand, Cory, Root and Kingery, are all poor men, farmers and unable to develop the mines. Two miles east of these claims, Hartstrand, Bemis and Small have several locations that prospect well, which they are working with an arastra, lately started, though one ledge has been prospected for a number of years. Offield has a good prospect here too, and one small "seam" that is paying small wages. Hartstrand, Bemis and Small have a seam that prospects on an average \$1 per ton, so they tell me, but water is scarce there. John Bolongot or "French John" as he is generally known is piping in Squaw gulch, this claim has been worked a long time. He uses 1,500 feet of six inch pipe, and has a 50 foot bank. I can't tell how the claim pays. A mile above S. C. on the west bank of Scott river we come to the Porter Flat claim, owned and worked by a company of 11 Chinamen, with 2,200 feet of six inch pipe. They have a large amount of ground, and it is the writers opinion that they have made considerable money the last few years. A little above and on the opposite side of the river we see a claim owned by Macaulay & Welker. Only enough work has been done on this claim to hold it, though it prospects well. Just above bar, Horan and others have a claim, developed as extensively as the last. Next is the "Last Chance," owned by Denny, Pederson and several others; this was worked on a small scale last year and I think cleared expenses. The three last mentioned, by the outlay of a little capital, would undoubtedly pay big, and sometime they will be known as paying drifting claims. Here the east and south forks unite their waters. Adjoining the "Last Chance," up the south fork from the mouth we see the great "Montezuma Flume." This is one of the most complete in the county. It is a mile in length, four feet high and six wide. Putting in new blocks last year cost \$2,000. The Montezuma claim has paid at times well; \$1,700 in one day I am informed, though I never heard what it cleaned up last year. I am told that from first to last, Alex. Parker, the present owner, has expended \$65,000 and was offered \$75,000 for it last year, though I don't know how correct this is. It started up a short time since. Alongside and a little below or northeast is the Fortune claim, owned by Mitchell, Denny & Co. This claim has been worked four or five years. There are shares owned by four men. They took out \$8,000 last year, and had a short season on account of putting a new pump, new flume, moving, etc., etc. None of these claims are over five miles from my cabin ("Little old log cabin in the mountains"), of the south fork.

About other mines in this vicinity I will speak in the future. All the heavy drifting claims on the Klamath paid well last year. The Fort Jones took out \$20,000, though they had several break-downs, stoppages, etc. There are several large claims near this one of which I may have more to say at another time. At Oro Fino and Quartz Valley the outlook is particularly favorable. I may pay this section a visit soon and will then be better informed. I am satisfied there is a good field in this county for capitalists, both in the mines and stock farming interests.

R. D. NUNNALLY.

Bobs Cabin, Siskiyou Co., April 4, 1884.

BIG WORK FOR ONE MAN.—The Eureka Sentinel says: The prodigious energy of Martin Piantoni, one of our stoutest-hearted prospectors, is meeting with its just reward in the Dead Broke mine. Martin, unaided by partners or outside capital, has done an immense amount of work in his mine. The tunnel, drifts, winzes, shafts and general openings aggregate 4,000 feet. He has all of 2,000 tons of ore in the mine broken down and exposed.

Inventors' Memorial to Congress.

Address and Memorial to the Honorable Senate and House of Representatives of the United States in Congress Assembled:

We, the undersigned, Inventors, Manufacturers and other Citizens, interested in the progress of the useful Arts, and in favor of equal justice to all men under the Constitution, most respectfully, but urgently, petition your honorable body in respect to existing wrongs and threatened injustice to a most useful class of citizens.

From the very foundation of our Government, it has been its settled policy to secure a just reward to all inventors, and it is to the inflexible maintenance of this policy that we are indebted for the unparalleled advancement which we as people have made in the useful arts; all that is glorious in our past, or hopeful in our future, is indissolubly linked with that inventive genius which to-day enables us to pay higher wages, manufacture a better article, and sell it cheaper in the markets of the world than our competitors.

Most of the manufacturing business of our country is done under the authority of Letters Patent, which represent modern improvements, without which modern business could not be transacted. And the time has come when the inventors, who yearly add millions of wealth to the country, and the manufacturers who distribute this wealth, should receive the consideration they deserve.

The Patent Law, as it now stands, is, in some particulars, both unjust and ambiguous. Unjust, in that it punishes the Patentee for securing his rights abroad by restricting them at home; and ambiguous, in that it is susceptible to and has received different constructions by the Courts. Recent decisions have been to the effect that Patents not limited as required by section 4887 of the Revised Statutes, are void, and yet, owing to the difference between the Patent Laws in foreign countries and our own, it is impossible to tell when such limitation begins, or how long the term of the patent will be.

Grave doubts are entertained as to the legality of appropriating the Patent Fund for any purpose other than for which it was created; and we believe that no more insidious or successful scheme for breaking down our Patent System could be devised than that embodied in a bill, which recently passed the Senate, for providing an educational fund for certain States and Territories out of the surplus funds of the Patent Office. It never was intended that revenue to the Government should be obtained from the Patent Office; and the demand that an additional tax of one hundred and fifty dollars (\$150) be levied on every patent issued, as per Senate Bill No. 300, has no excuse, except in the cupidity of its projectors.

Not only are the fees now paid sufficient for all purposes, but the fact that a surplus of two million and a half dollars now stands to the credit of the Patent Office in the United States Treasury; and the other fact that more than two thousand patents were withheld during the past year for non payment of final dues, not only argue against additional fees, but show that greater liberality might be extended to inventors with good results.

The vindictive sentiment which for years has denounced the right of property in patents has found embodiment in one of the most unscrupulous and powerful combinations that ever existed in this country, and has not scrupled to invade the sanctity of our National Legislature, and there demand that our Patent Law be so changed as to render it a weapon of oppression against, rather than a protection to the inventor.

It is well known that House Bill No. 1612, and Senate Bill No. 300, originated with this combination, and were intended to assist in carrying out its principles, as set forth in the declaration of one of its representative members, viz: "When we see a good invention, we use it. Sometimes we are made to pay by the plucky inventors, but in the aggregate we pay less than if we had taken a License."

Complaint is constantly made of the inefficiency of the Patent Office, and great injury to inventors and annoyance to the public have resulted. This is not the fault of the Patent Officials, but arises from the neglect of Congress to appropriate enough of the Patent Fund to conduct the business of the office properly. It should not be forgotten that the increase of business in the Patent Office is without parallel in the world; the number of applications during the past year amounting to 35,000, and it appears that the increase of business has not been accompanied with a corresponding increase of the examining corps; hence the work of the office is largely in arrears and daily accumulating. The officials are daily compelled to inform applicants that weeks and even months may elapse before their cases can be reached.

The want of room and facilities for transacting the business of the office are such as would disgrace any private establishment in the country, and yet, a recent request from the Commissioner for additional help and room has been met with a reduction of the force then employed, and the appropriation of more room for the use of the Interior Department.

The Patent Building was erected for the exclusive use of the Patent Office, and was partly paid for out of the Patent Fund; but notwithstanding this, the Interior Department, with its numerous bureaus, has taken possession of and so crowded and cramped the Patent Office that

it has not half the room necessary for its use. In view then of the injustice herein set forth, your petitioners pray:—

First—That a special commission, including one or more parties of practical experience, be appointed to revise the Patent Law.

Second—That skilled persons be employed to make a digest of all the matter in the Library of the Patent Office, with abbreviations of all inventions, so arranged as to correspond with the classification in the Office, so that each examiner may have everything relating to his class, conveniently at hand.

Third—That foreign patents, or at least drawings of such, be duplicated and classified so as to afford a convenient reference.

Fourth—That the statute which limits the term of a home patent to that of the earliest expiring foreign one, be repealed.

Fifth—That the fee for granting patents shall not greatly exceed the expenses incurred.

Sixth—That the Patent Fund be forever sacred for the uses and purposes for which it was created.

Seventh—That the Patent Office Building be used exclusively for Patent Office purposes, and that so much of the surplus fund as may be necessary for the proper and prompt performance of its business be expended therefor.

Eighth—That the working forces be increased, and such salaries as will secure efficient service be provided.

Ninth—That in view of overtures made by foreign Governments, authority be given the President of the United States to conclude arrangements for the joinder of the United States in an International Union, for reciprocal protection of and legislation for patents.

Tenth—That a commission be established with authority to order such Patent Office expenditures, not in excess of receipts, as such commission may from time to time deem necessary.

Money Scarce at Cœur d'Alene.

In a recent number of the MINING AND SCIENTIFIC PRESS, was published an article specially urging all who were going to the new Idaho placers to provide themselves with as much ready money as possible, and if they could, to leave a small "stake" somewhere on which they could draw to carry them back. To be broke in a settled community or where ore is known is had enough, but when it comes to being out of money at a new and distant place like Cœur d'Alene, it will be found to be "hard times." Prices for all necessities of life are high at the new camp, transportation is expensive, and plenty of money is requisite to get along with any sort of comfort. The following article from the Cœur d'Alene Nugget will show the state of business matters in the new camp:

Money is being expended with lavish hands in the Cœur d'Alene mines. Town lots cost a goodly sum, to begin with; buildings cost enormously, more, in fact, than anyone could suppose, considering their appearance and character; goods cost so much in the way of freight, that the original valuation or purchase price is lost sight of entirely; and finally, all kinds of labor or help command high wages. Many a man comes here thinking he has a snug little capital, and before his "opening" day comes, is broke and in debt. Comparatively few of our business men have much capital left by the time they are ready to begin making money. Nearly all of the small business firms underestimated the cost of starting, and have little spare cash until they make it from the sale of goods. Of course there are exceptions, numbers of them.

There are men with great wealth and unlimited backing, but they, by no means, are in the majority. Men are getting rich, or at least doing well, who started for the mines with from \$500 to \$2,000. It is not an easy place to borrow, it one runs short of funds. No matter how good a man may be, there is use for all the surplus coin in camp, and men do not like to lend. Interest is no particular object, as investments are likely to double or treble capital in a day, and lending money is too slow a business in such a country. To all who contemplate coming here to invest in any kind of commercial pursuit, or who intend to start in any kind of business, our advice would be to bring money enough. Calculate just how much you may be called upon to pay out, and then multiply by two, and add to the product a few hundred dollars for contingencies. Of course you can start here on very small capital, many men managing to start on nothing, but it is perplexing business, and won't do to depend upon. The profits in any legitimate pursuit are enormous. Once established, a share of custom is all a man can ask to require a competency. A few months of present prices and present trade will send many a man out of the mines rich, whether there is gold dust on the bedrock in Pritchard creek or not. Nearly all kind of business is slightly overworked at present. Accommodations are not provided with a view to those who are now here, but to those who are coming. It is possible there may be a few days of stagnation about the time the trails are melting away into wagon roads. But it will last only a few days, and may not be noticeable. When the roads are passable, and men and freight can come in easily, there will be such a rush to this camp as will set all figures at defiance. Those who have been too tender to endure hardships, will pay those who have dragged goods over the trails and prepared ac-

commodations. Every day of fatigue and worry, every drop of sweat, every pang of self-denial and every sacrifice of comfort will be worth dollars; good hard dollars, and those who come into the mines at the later pleasant day, will not begrudge the dollars which the pioneers have so richly earned.

Mining Debris.

A gentleman in Placer county, in this State, writes to the State Mineralogist asking him whether the late debris decision will interfere with the working of the drift mines in that locality. The State Mineralogist quotes considerably from ancient writers and also describes the state of the river navigation in early days in this State. The gist of the answer, which is very long, is, however, summed up in the following conclusions:

1. The gold fields are not exhausted.
2. The question of slickens is far from being settled.
3. The miners and farmers have a common interest in the welfare of the State, and in the production of gold which is shared by the whole country in a lesser degree, and to a certain extent by the whole world.
4. The farmer cannot escape the effect of floods and the action of the elements even if hydraulic mining should be stopped.
5. The miner cannot collect gold without using and discoloring the water of the streams.
6. Decrease in the production of gold causes low prices and numerous inconveniences, which affect the farmer as well as the miner.
7. There are large tracts of land in California which can be used for agricultural purposes where no mining is likely to interfere.
8. The area upon which placer gold can be profitably mined is limited.
9. If it is wrong to mine by the hydraulic process in California, it is equally wrong to mine in Idaho, Colorado, New Mexico and in other States and Territories, and the general government entailed a serious hardship on many by specially encouraging mining, as it certainly has done.

I am of the opinion that a convention of miners and agriculturalists should be called to discuss this question and to devise plans to overcome the undisputed inconvenience and injury to the farmers caused by hydraulic mining. It is my present opinion that the general government should step in and aid in the settlement of this most important question, in which all the people are interested. The gold of California was an important factor in the hands of the Government during the time of sore adversity of the nation, and would be again under similar circumstances. The whole country should give this matter attention, for it is a national question. What takes place in California must follow in the course of time in other States and Territories, for which reason it is my opinion that the serious attention of Congress should be called to the subject by the people of California; and that body be asked to appoint a commission to investigate and suggest some relief for the troubles both of the miner and agriculturalist which have become very serious. Capital is alarmed, miners are discouraged, some of the most prominent have either left the State, or are preparing to do so. Other countries see the advantage of our system of mining, and will receive with open arms the skilled miners and artisans we are willing to spare. They are envious of the prosperity of California which we do not realize or sufficiently appreciate.

I have said more in this communication than was necessary to answer the question asked in your letter, but I consider it a duty to express my opinion, as it is the duty and privilege of all citizens, and I think the more the question is agitated the more fair and impartial will be the final settlement.

POOR CHANCE TO SELL MINES.—An experienced mining man writes from New York as follows: "The New York mining market is practically dead; there has not been a sale made in months. Everything was sent to London, and in London it is the same as it is here. An acquaintance advertised for mine to send to England; ninety were offered of which he selected one, and another party advertised and forty-five were offered of which he selected one. A broker said last week there has not been a bona fide sale of stock made at the mining exchange in six months. The Mining News, a few evenings since proposed that they close the exchange, and save the rent or merge it in the oil exchange, which, with its tributary bucket shops, are gambling marts. More mining offices are for rent here each week. It would appear to me as a waste of time for miners to come here to sell mines; the money expended in expenses had better be put in the mine. The same may be said of the other mountain States and Mexico. Denver should in the future be the mining center to distribute capital in the Sierra Madre mineral fields, and houses there make some practical arrangement to get capital from the Eastern cities. This could be done in the way of loans on mines and reduction work, as the mining business was carried on in Old Mexico, where money was loaned in Madrid and Genoa on mines, in preference to any other property. The old system here has come to an end, and much the same in Chicago."

MECHANICAL PROGRESS.

Steel.

Of all the metals at man's command, steel ranks among the most useful, if not most valuable; and human nature is presumed to possess some qualities resembling that of fine metal, as Skakspere says:

"O God of battles steel my soldier's hearts."

The earliest discovery or invention of steel was in the remote past, but the nature of the change in the iron was not understood. It was prepared by fusion, and not by cementation as in later days. Ordinary steel contains from 0.5 to 1.5 per cent of carbon. Its hardness and fusibility increases with the amount of carbon, and when this element is in excess it becomes cast-iron. When the proportion is small, the metal is termed mild, or low steel. An expert defines steel as an alloy of iron, which is cast while in a fluid state into a malleable ingot. Steel has been produced as an experiment by heating the iron to be converted in contact with diamond.

Steel was imported from the country of Chalybes, into Greece about 500 B. C. and the name Chalybes signifies steel. The description of steel-making by Aristotle shows that the process was repetitive, and that dross was eliminated. Heating several times in contact with charcoal was supposed to purify it. It was only lately that steel was understood to be a carburet of iron.

A crude steel is obtained by the finery process; namely, by removing the impurities of cast-iron by jets of air blown into the bath of molten metal which is covered by a layer of charcoal. The varieties of steel in modern use are very numerous, many of them having peculiar adaptation to a certain specific purpose in the arts.

The natural steel of Germany is made directly from the ore, and sometimes from pig-iron in the Catalan forge. The ore is smelted, as for iron, in blast furnaces, but the blast is weaker, and is directed, not upon the metal, but in a horizontal direction above it. The metal is kept covered with slag, or vitrified cinders, and is not disturbed by stirring. When the iron is judged to be sufficiently refined it is taken out and forged.

The steel in India is made by melting the crude, native iron, in crucibles, in which pieces of wood or leaves are introduced. It is called India steel, or wootz, and is valued as the material of edge tools. The name is often appropriated by English manufacturers for their own products, which are probably ordinary cast steel of good quality. The process of procuring this steel is primitive and laborious, but the Hindoo manages to obtain a most excellent steel.

In England, the Swedish iron is used for making the best steel, it is received in bars three inches wide and five-eighths of an inch thick, and about twelve feet long. The process is elaborate and while useful for some purposes is not considered to be best adapted for making tools for working wood or metal.

Cast-steel was invented in 1840 by Benjamin Huntsman, near Sheffield. His process was to place small fragments of blistered steel in a crucible of fine clay, place broken green glass above it, and lute the cover; that is, use a composition of clay for stopping the juncture of vessels so closely as to prevent the escape or entrance of air, and then place the crucible in a furnace. When melted it was withdrawn and poured into an iron mold. And this is essentially the process still followed in producing fine cast steel suitable for cutlery and tools for working wood or metal.

Various efforts have been made to produce cheap steel on a large scale. Of these the Bessemer method was most successful.

The Damascus steel is made from the natural ore by the same process as the wootz.

Yungsten steel is remarkable for its magnetic capacity. Yung is from the Swede and Danish, meaning heavy, and sten or stein is stone. It is a metal of grayish white color, and of considerable luster, brittle, and nearly as hard as steel, so that some difficulty is experienced in obtaining uniformity in the product. Its specific gravity is near 17.6, and sometimes, when heated to reduce in the open air, it will take fire.

In the sculptures at Thebes, butchers are represented sharpening their knives on a round bar of metal which is suspended from their girdles, and which are evidently of steel. It was for a long time supposed that steel or iron was unknown to the Egyptians, but this has been disproved by paintings and later discoveries, as some of the sickles are represented blue and others red, indicating the knowledge of both bronze and steel.

Steel is a most interesting study of metallurgy, and poets borrow it for comparisons upon every conceivable subject, and Wordsworth, speaking of water, remarks:

"These waters steeled
By breezeless air to smoothest polish."

Many a life lesson can be drawn from this valuable metal. To have our lives as flawless for slander to stripe our hearts as if they were incased in polished steel, and leave us untainted by its touch, and to be as true in our love as this shining steel, all this and more could be inferred from this useful gift of nature.

Transmission of Power by Shafts.

In his recent lectures on "Transmission of Energy," Prof. Osborne Reynolds said: "In a revolving shaft, neither the stress nor the velocity is uniform over the section, both varying uniformly from nothing in the middle to their greatest value on the outside; so that their mean product is exactly half the product of the greatest values. The greatest power per square unit of section a shaft can transmit is half the product of the greatest stress into the velocity at the outside of the shaft. Taking, then, the greatest safe working stress of steel at 15,000 pounds on the square inch, taking what is the greatest practical velocity at the surface ten feet per second, the speed of railway journals, the work transmitted is 75,000 foot-pounds per second per square inch of section, 135-horse power; so that we should have to have a shaft of upward of seven square inches in section to transmit 1,000-horse power; that is, a shaft of over three-inch diameter. The friction between such a shaft and lubricated bearings is well known—0.01; so that calculating the weight of the shaft twenty-four pounds per foot, we have power spent in friction about 52,000 foot-pounds per mile; that is, one-tenth the total power the shaft will transmit. That is, if we put 1,000-horse power into a three-inch shaft, making 500 revolutions per minute, we ought, at the end of a mile, to be able to take 900-horse power out of it. If we had to go farther the size of the shaft might be diminished, so that in the next mile we should again lose a tenth, and if we repeat this process seven times we shall, at the end of seven miles have left about half the original power put in. It will be thought, perhaps, that a three-inch shaft is very small to transmit so large a force; this is because the speed of 500 revolutions per minute is inconveniently high for purposes if employing the power; but if it were merely a question of transmission it would be about the best speed. This, then, shows the limit of the capacity of shafts as transmitters of work."

STEAMING AND BENDING WOOD.—In an address recently delivered by Mr. H. G. Shepard, of New Haven, Conn., relative to the use of wood in carriage making, he said that after a piece of wood is bent, its characteristics undergo a considerable change. The wood is heavier, and its fibres have become interlaced; it will sustain more pressure and strain than straight wood in the same directions, either across or with the grain. He said: A piece of timber that has been steamed, whether it is bent or not, has its stiffness increased. It is more brittle than it was before, and for some uses it will do as well, and yet there is a quality that the steaming process and the kiln-drying process affect in much the same way; they both cook the gum in the timber and make it brittle and stiff. There is a kind of hickory that never becomes stiff by a natural process of drying, and one of the desirable qualities of a spoke, rim, or whiffletree is stiffness as well as strength. You take that hickory—and it is the very best we have—and steam it, and it is better fitted for these purposes than it was before. It is difficult to tear apart a piece of bent wood; the fibres are interwoven, one with the other. We do not perceive the change on the outside, but when we come to split the stick open we find that its character is entirely changed. Apropos to the above, a correspondent of the *Scientific American* asks in regard to drying wood with superheated steam: Can it be successfully done? Would it be as likely to check as when dried with hot air? What is the better plan of superheating steam? That journal answers as follows: Superheated steam may enable you to make a hotter drying room. We do not know that it has many advantages and is liable to cause trouble. Eighty pounds boiler pressure with sufficient pipe will enable you to boil the sap out of the wood. The best way to prevent checking is to heat the wood in steam for a short time or until the wood gets thoroughly heated through, and then ventilate slowly, keeping up the heat in the dry room.

PIPES MADE OF STEEL PLATES.—Pipes made of steel plate are coming into use in England for the conveyance of water under high pressure. The plates are coated with lead on both sides by immersion or otherwise, then rolled to form, riveted, soldered the whole length, and covered with pitch. Of this method it is said the first cost of the steel is not much greater than that of iron, and the steel pipes possess considerable advantages over those of iron; the lead coating is superior on account of the fineness of grain in the steel, and the strength of the pipe is much greater.—*Exchange.*

FOUR-SIDED DRIVING BELTS made of ropes are reported as the latest invention pertaining to the milling industry in England. They are made in sections and screwed together in such a manner that the connection offers no resistance to the pulley. The inventors claim that this form of driving belt is more durable and stronger than leather belts. Their relative value, as far as ropes are concerned, is not mentioned, which seems to be a rather suspicious neglect of the principal point.

CAR WHEELS.—There are said to be 10,000,000 car wheels running in this country, and that there are no less than twenty-seven distinct "diseases," so to speak, which a car wheel is liable to contract in the course of its manufacture.

SCIENTIFIC PROGRESS.

Progress in Electric Discovery.

Several announcements of remarkable discoveries in the electric field of science have quite recently been announced: The *London Times* of a recent date informs us that a new electrical contrivance had been perfected by Mr. A. St. George, the inventor of the telephone which bears his name. This invention, which is really supplemental to the telephone, will enable every description of conversation carried on through the instrument to be not only recorded, but reproduced at any future time. Briefly stated, Mr. St. George's invention may be thus described: A circular plate of glass is coated with collodion and made sensitive as a photographic plate. This is placed in a dark box, in which is a slide to admit a ray of light. In front of the glass is a telephone diaphragm, which, by its vibrations, opens and closes a small shutter through which a beam of light is constantly passing and imprinting a dark line on the glass. Vibrations of the shutter cause the dark line to vary in thickness according to the tones of the voice. The glass plate is revolved by clock-work, and the conversation as it leaves the telephone is recorded on the sensitive plate, the imprinted words spoken being fixed as is done in photography. The plate can be brought forward afterwards, and when replaced in the machine and connected with a distant telephone, will, when set in motion, give back the original conversation.

Invisible Wire.

Platinum wire has been drawn down so fine by Mr. H. F. Read, of Brooklyn, as to be invisible to the naked eye, although its presence upon a perfectly white card could be detected by the touch and could be seen with the aid of a small magnifying glass when the card was held in such a position that the wire cast a shadow.

A small platinum wire, about No. 18, was inclosed in a close fitting tube of silver. The tube was made by taking a long and narrow sheet of silver, about one-twentieth of an inch thick, folding it over into a cylinder, and drawing down until the wire would just fit in it. This was then drawn down until the tube containing the wire was only as large as the original wire. A short length of this was cut off and incased in a second tube of silver, which was drawn down in the same way. This operation was repeated until the platinum wire had been reduced sufficiently in diameter. The last wire was drawn as fine as the dies would permit, when the silver coating was removed by an acid. During the work it was necessary occasionally to anneal the wire.

The resulting wire was in short lengths and had no strength. It was designed to be used for the cross wires in telescopes, its perfect opaqueness and fineness rendering it particularly applicable, but its extreme weakness made its handling almost an impossibility.

THE COLOR OF SUNLIGHT.—Since the time of Newton it has been assumed that all the radiations of the sun were to be found in the spectrum, and that these reunited make white light. There is also a tacit assumption that white light is pure sunlight. Some of the early experiments at Alleghany have been mentioned which showed that the light as we receive it has been somewhat altered by the sun's atmosphere. The change is an absorption of rays from the blue end of the spectrum. It follows that our sunlight is more red and less blue, and far less intense than it would be if the solar atmosphere did not intervene. But we are concerned with something nearer home. Our own atmosphere repeats the performance, strangles many rays at the blue end of the spectrum, and comparatively few at the red end. What does this mean? Let us shake hands with our friend who wears green goggles. We, too, have all our lives seen things in a false light. If we could place ourselves outside of our atmosphere—say on the moon—we should find that sunlight is not white; that the sun itself is really blue. To the inhabitants of "other worlds than ours" the sun may be a bluer star than Vega.—*Harper's Magazine.*

THE LATEST BOSTON NOTION.—It is rumored, says a Boston paper, that a syndicate representing over \$100,000,000 has been formed for the purpose of developing and introducing an invention which is said to combine the usefulness of the telegraph and telephone with that of the electric light. The plans of the company, for some unexplained reason, are kept very dark, and the possibilities of the invention are somewhat indefinite; enough so to challenge doubt of the reality of the whole thing, if the claims put forward by those who talk about it were not so positive and evidently serious. One gentleman, who said he was not at liberty to state the names of the inventors or to go into particulars at present, said: "The electric light will soon be a thing of the past. The disk is an electric apparatus, and by it we, in the night time, can receive sunlight, from any point on the earth where the sun is shining. Don't be incredulous, my friend, sunlight has already been transmitted to a dark room over a wire; I have seen it myself." Then, too, scenes of any kind, in action or repose, however distant, which can be focused on the disk at the transmitting end of the wire, are registered with

photographic accuracy on the disk at the delivery end. These particulars are all given, with more or less positiveness, by other persons who seemed able and willing to talk about the invention. None of the parties interviewed, however, would give the inventor's name or localize the invention in any way, except by saying that "it originated in Boston."

ATMOSPHERIC WAVES PRODUCED BY VOLCANIC ACTION.—Professor Soester, director of the observatory of Berlin, and others, have remarked the existence of sudden barometric changes in calm, steady weather occurring during the month of August last, and have traced their connection with the eruption of Krakatoa on August 27th. The chief shock of this eruption was felt about 7 A. M. on that day, and the resulting atmospheric wave appears to have traveled over the world. The first wave was felt at Berlin about 10 hours later, giving a velocity of propagation of 1,000 kilometers per hour, or nearly the speed of sound. About sixteen hours later a second disturbance was felt, probably due to the wave which did not come direct, but around the other side of the world, by America. For the same speed of propagation the time would correspond to the distance in this case. Moreover, thirty-six hours after the first disturbance at Berlin, a third was felt of a weaker sort, and this corresponds again in point of speed. Lastly, a fourth and weaker disturbance was observed thirty-four hours after the second wave, the acceleration in this case being due, perhaps to atmospheric currents from east to west.

THE SYNCHRONOUS TELEGRAPH SYSTEM A REALLY MARVELOUS INVENTION.—In the opinion of the eminent electrician, Professor Houston, the practicability of the synchronous multiplex telegraph system is entirely assured. He expresses the opinion that we are on the eve of a revolution in telegraphy as marvelous, if possible, as that which introduced the telegraphic system. The synchronous multiplex system is absolutely a departure. The division into circuits is based on the simultaneous rotation of two cylinders, or disks, as they may be termed, one at each end of a line; a single wire constituting the main line is thus connected simultaneously, at both ends, with corresponding operating instruments, and it is transferred from one instrument to another so rapidly that the operator or sender does not realize that the line has been disconnected from one instrument to another, since each operator has always the line at his disposal, even at the highest rate of manipulation. Recently seventy-two distinct and separate circuits have been operated on the same line. Either the Morse or printing system may be used.

FORMS OF COMETS' TAILS.—Th. Schwedoff has shown that comets' tails may be represented by waves, produced by the passage of the nucleus through a resisting medium. His theory has the advantage of dispensing with the assumption of any doubtful agencies, and of predicting the form and position of the tail in any comet of which the elements are known. Faye has endeavored to demonstrate that the hypothesis of an interplanetary resisting medium would require a mass, within the limits of our system, a hundred thousand times as great as that of the sun, even if the density of the medium were only 1-2,000 as great as that of our atmosphere. He supposed, however, that the ethereal density does not vary between the surface of the sun and the orbit of Neptune. If we admit, with Encke, that the density of the cosmic medium decreases in inverse ratio to the square of the distance, we readily find, for the total mass of the medium, a value which is only one thirteen millionth part as great as Faye assumes.

PHOTOGRAPHING SOUND VIBRATIONS.—Recent experiments have shown that the photographing of sound vibrations is a practical success. A small thin platinum plate was attached, perpendicularly, to a thin iron plate, which, as in the telephone or phonograph, was fixed on a wall piece and vibrated to sound. With a solar microscope an image of the platinum plate was focused on a screen, after which a prepared photographic plate was quickly moved across in the plane of the screen, by a strong spring, while the mouthpiece was spoken to. A bounding line between light and shadow was thus obtained on the prepared plate, forming a curve closely corresponding to the sonorous vibrations—simple curves for vowels, complicated ones for consonants.

THE height and velocity of clouds have been determined in England by means of photography. Two cameras placed about 600 feet apart were provided with instantaneous shutters, simultaneously relieved by electricity. The observer measures the angle of inclination of the cameras at the position of the cloud as photographed on the two plates, and from these data a trigonometric calculation gives the distance and height of a cloud with great accuracy.

RAPID PROGRESS.—The first line of telegraph was erected less than forty years ago, and at the present time there are more than 1,000,000 miles in operation. The United States comes first, with 250,000 miles, with the immediate probability of adding another 100,000 miles; Germany comes next with 150,000 miles, and the Great Chinese Empire last, with 1,200 miles.

Dakota Mines.

The Lawrence County Mining Region.

This county lies in the southwestern portion of the Territory, and is bounded north by the north fork of the Cheyenne or Belle Fourche river, east by the south fork of the Cheyenne, south by Pennington county, and west by Wyoming Territory. Its principal creeks and tributaries to the Cheyenne are Spear Fish, Whitewood, Bear Butte, Alkali and Elk. The engraving shows the geographical features. The western portion, within the limestone belt of the country, is divided into the mining districts of Whitewood, Bald Mountain, Deadwood, Greenwood, Galena, New Carbonate or New York, Spruce and Two Bits, and also contains a part or Rockford district.

The Whitewood District

Comprises the group of mines known as the Gold Belt, on which the Homestake, Deadwood, Terra, Father De Smet and others are situated. Extending from the belt mines in a north-western direction are wide blanket veins of cement, rich in gold. These veins follow the slate for bedrock, and are capped by porphyry rock. Through them run numerous channels, like the beds of

ancient streams, along which this cement, a conglomerate of quartz, pebbles and other rock, is often found in beds from 15 to 20 feet in thickness. One large channel, on which the Lancaster Company is working, is seen in the hill between Deadwood creek and Black Tail creek, and seems to have come from the vicinity of De Smet. All the hillsides below the porphyry line are covered with float cement, which in the gulches below is mixed with gravel, decreasing in quantity as the stream descends. Similar cement conglomerate is found in Pennington county. The mines of the Homestake group have been constantly worked. The ore is handled economically, and thus permits a profitable treatment of low-grade ores with satisfactory results. A body of paying ore reported to be at least 100 feet long by 70 feet wide, and 100 feet deep, in an open cut between the Highland and Homestake mines, was, after the necessary precaution to guard against accident and destruction of property, thrown down at a single shot. The ore, amounting to thousands of tons, was thus economically broken up, a greater part ready for the shovels, and requiring but a few shots in the boulders too heavy to load upon the cars. From the De Smet mine, belonging to the same company, ore has been extracted and milled at the rate of from 200 to 400 tons a day.

The gross product of the belt mines according to the United States Mint Director's report was, up to July 31, 1882, equal to \$13,434,116. Average of 1,512,037 tons, or \$8 78 per ton.

The Caledonia shows two distinct veins, or lodes, about 95 feet apart, one called the Discovery and the other the Caledonia. The mine has been opened by a cut 150 by 100 feet on the east side, and 800 feet of tunnel on the west.

The Durango mine is located about half a mile west of the Homestake mine, on the north side of Main street, Lead City. The mine is nothing but a wash, which here for a distance of about 200 feet long by 20 feet wide has accumulated in pockets of a gold-bearing cement.

There is no sign of a vertical vein in the tunnel run, and the bed rock is as zigzagged as forked lightning. Wherever this bed-rock pitches can be found gold, and here was where miners were led to believe a true vein had been found. It only took about 6 feet of digging to

convince them of the fallacy of the idea. As the tunnel was run to the north it encountered a hill, and barren rock was struck. This is easily explained: The miners had got beyond the pocket, where, at some period in the past, the gold had been accumulated by a running stream.

Near the Cheyenne Consolidated are located the Grant, Conway, Financial, Anchor, Moose, Aleck, Grand Deposit, Baltic, Brigham, Corinne, Utah, Laramie and numerous other locations which have been worked to a greater or less extent, under great disadvantages, but the work has developed the fact that the whole hill is a mass of gold-bearing rock, assaying \$6 per ton.

Galena, or Bear Butte District.

Located on Bear Butte creek and its tributaries, is the oldest silver-mining district in the Black Hills. Systematic work was commenced in 1879, but has since been developed with great energy. The production of silver bullion during the year 1882 was reported at \$232,400 in silver, and \$650 in gold. At the Oro Fino mine, under the charge of Superintendent Van Sycle, the company have worked twenty-eight men, seventeen (including the superintendent) at

shafts averaging 100 feet in depth, and tunnels of 50 feet.

Bald Mountain District.

This district comprises an extensive silver belt, on which operations were retarded during the summer on account of the scarcity of water. A project is under way to construct a narrow-gauge railroad down Grant canyon to the reduction works in the district. The Portland Mining company made developments on several ledges showing large bodies of silver ore carrying some gold and considerable lead. They have erected a mill and chlorination works having a daily capacity of 30 tons, and have recently purchased the Trojan group of mines, and expect to produce large quantities of bullion. The company's 20-stamp pan mill was dependent for matter upon springs having their sources on the property of the company, which are found by actual experience to furnish an amount sufficient for experimental works during the season. An ineffectual attempt was made to collect bed-rock water by running drifts. In

Carbonate District.

About eight miles west of Deadwood, very extensive veins of carbonate have recently been

The People's Food.

While all sorts of commissioners and officers are created and appointed to mitigate evils or cure abuses, the frauds committed on a long suffering people in the matter of food adulterations seem to be continued without official rebuke. Being something that is everybody's business, no one attends to it. In this city we have an official who sees after meat which is unfit for food, but as people's noses in that matter are generally good indicators, this can be guarded against with little trouble.

It is in connection with the substances which are adulterated with deleterious articles that supervision is most necessary. The people unconsciously take into their systems substances of a positively hurtful nature in consuming the ordinary foods which they buy in the stores.

It would seem as if our National or State legislators might turn aside from mere politics once in a while, and give attention to the subject of foods of the people. A means might surely be devised by which the adulterations could be detected and a remedy applied. If people pay for flour, milk, butter, etc., they ought to be entitled to flour, milk and butter, and not mere

imitations. But the people, as a whole, are not chemists, and are not able to detect the wrong from the right. Government, State or Municipal officers might be detailed to perform these duties. The mere passing of laws will do no good. Provisions for enforcement must be made, and besides that, good, heavy, exemplary fines for breaking the laws should be enforced. We have no suggestion to make as to how this should be done; but that some check to the wholesale adulteration now going on should be commenced is perfectly apparent to all. Tea made principally of willow leaves and coloring matter coffee, mixed with beans and chic-



MAP SHOWING THE LOCATION OF THE RICHEST OF THE BLACK HILLS DISTRICTS.

the mine, seven at the mill, and four hauling and cutting timber. The vein lies north, and ore has been taken from a shaft less than 50 feet deep. The width of the ledge is claimed to be about forty-five feet. Red Cloud mine is now the property of the Fort Meade Mining Company. Twenty wagon-loads of base bullion, worth, including lead, \$56,000, were taken from a ten day's run of the Sitting Bull smelter, in March. The Sitting Bull mine produced considerable bullion, which was shipped by cars from the mine to its 30-ton smelter. Fifteen thousand ounces of silver bullion milled from low-grade ores were taken from the mine, and 100 tons of base bullion were produced, which contained, besides lead, 46,000 ounces of silver and a small quantity of gold. A ten day's run in March gave 80,000 pounds of base bullion worth \$8,000. Besides the ores treated by the smelter, considerable milling ore was taken out and reduced at the Florence stamp mill.

Greenwood District

Is situated on Box Elder creek, in the central portion of the hills. The streams occupying this belt are the Deadwood, the Black Tail and the Hidden Treasure creeks, flowing in a north-westerly direction through blanket veins of cement or conglomerate rich in gold. The ore found in this district is mostly chloritic slate, containing free gold and lying in large bodies. It can be milled at a nominal cost, and is about the same grade as that in the other parts of the hills. Wood and water are abundant, and can be utilized at little expense. Box Elder creek carries water enough to run 6000 stamps, and the hills on the other side are covered with an abundance of pine. The mines in this district have thus far been but slightly developed by

discovered, showing ore of a high grade and producing as high as from 500 to 1,000 ounces of silver, and from 60 to 80 per cent of lead. These mines have not been producing in great quantities, but are being rapidly developed, and will soon be among the valuable producing mines of this region. A large number of ledges have been discovered, on which developments have been made, and from present indications this camp is likely to become prominent in the Black Hills.

Two Bit District

Is a gulch near Spruce gulch, in the neighborhood of Deadwood City. The ores are of high grade, containing some silver. The principal locations are on almost horizontal ledges. The head of the gulch is no doubt bordering on the galena silver belt, as float of galena, rich in silver, is found deposited in its crevices. The ores of Spruce gulch, which are milled at Deadwood, about half a mile from Deadwood City, are of a high grade, but are not found in such large masses as in the Homestake belt. The veins are supposed to have been formed by sedimentary deposits, of which there appear to be two beds, one lying about 100 feet below the other. The Oro Cache, Anna and Ophir are located in this gulch on the lower vein.

The "Van Campen Compound" is the name of a new explosive, claimed to be more powerful than nitro-glycerine and perfectly safe. It is intended for railroad work, quarry work, coal, iron, copper ore, stump and boulder blasting. Mr. M. Ayres, of Oakland, the general agent on this coast, says you can cut it in pieces, stamp it on the ground, set it on fire and burn it up, and there will be no explosion.

core; flour spoiled with plaster of Paris and chalk; honey made up of glucose, syrup, etc., and butter made of lard, soap-fat, dead horses, and no one knows what else, and yeast powders filled with deleterious substances, are among the commoner things we have to put up with. Cottonseed oil represents the olive; pepper is only half pepper, horse radish is made out of turnips, and mustard only half its strength, are examples among the minor evils. In nearly every department the people suffer by paying for adulterated substances.

The vigorous steps being taken by some of the New York papers to find out the true inwardness of the oleomargarine manufacture, is doing much good in that direction. Should some great metropolitan journal undertake the thorough expose of this question of food adulteration it would redound greatly to its glory, and be productive of greater benefits than any North Pole expedition, African exploration project, or even full verbatim reports of any of our great social scandals. The source of the Nile will not interest so many as the means of obtaining pure foods; and the northwest passage is of less importance to the millions than the possibility of getting good milk and butter for every-day use. It may be that this object will one day become one of the important planks in what are known as party platforms. It certainly is of much more importance to the people than the mere abstract questions which often occupy our law-makers' time. The people should be protected from adulterated substances. They should have pure food and be sure to get what they pay for and not its mere semblance. The subject is of the highest importance to all.

The Leaching Process.

[CONTINUED FROM LAST WEEK.]

Furnace Loss.

We have:

55,167 pounds fine silver in the roasted pulp, being 17,519 pounds of pulp, assaying 0.3149 per cent.
62,400 pounds fine silver was contained in the raw pulp.

7,233 pounds fine silver = 11.6 per cent is the apparent loss.

During the roasting of these ores the draught was kept very sluggish, and the pulp was purposely not raked in the sixth hearth. On dropping the ore into that hearth and on shoveling and raking it in the other hearths considerable dust was evolved, which passed into our main flues.

Our flues are 7' high by 5' wide, and are only cleaned out once a year. They can only be cleaned out after the furnaces have been shut down several days. It was, therefore, out of the question to have them cleaned for this experiment.

We took great precautions to have the hearths very thoroughly scraped after the last charge of these ores passed through. Our own ores following the last charges of the experimental ores were tined by the latter; part of this was from the hearths and corners, and part dust from working the ores antecedent ones.

The first two *hacienda* charges, 1,500 pounds each, which followed the experimental ores, assayed 139 milles and 137 milles, the ores of the former in all the other furnaces during that day only assaying 70 milles. This accounts for 2,040 pounds of the silver lost in roasting the experimental ores, reducing the loss to 5,193 pounds. This figure will show a roasting loss of 8.3 per centum.

The next four or five charges of *hacienda* ores were still tinged with the characteristic color of the ores of the experiment. They assayed 80 milles and 77 milles, the *hacienda* ores pure only assaying 70 milles. The ores were roasted in a furnace which had not been stopped for two years, the bottom of which is somewhat uneven.

With well-constructed dust and condensation chambers, and with what is more important still, long and spacious flues, the roasting loss in these ores will be very light if the firing is done intelligently. They need very little fire.

Fifty pounds were taken from the roasted pulp while still hot; they were not included in the above weights; they would very slightly lessen the loss shown, leaving it 8 per cent.

Tests of the Roast.

Chlorine assays from the whole pile, forty-eight hours after the ores had lain moist in a vat, are as follows:

No. 1.—Buttons from 300-grain samples, boiled with concentrated sodium hyposulphite, gave .046 grains; original sample assayed 315 milles = 95.1 per cent chlorinized.

No. 2 gave buttons of .052 and .046 grains; original sample assayed 323 milles = 94.9 per cent chlorinized.

No. 3 gave buttons of .048 and .054 grains; original sample assayed 315 milles = 94.6 per cent chlorinized.

After the first four or five charges were roasted, 50 pounds were placed in a small vat and treated with our ordinary working solution, 2° B.

The tailings assayed:

18 milles = 5.25 ounces per ton of 2,000 pounds.

After forty-eight hours further leaching the tailings assayed:

15 milles = 4.33 ounces per ton.

18 " 5.25 " "

The cloth in the bottom of the vat did not filter freely.

Leaching.

The amount served to the vat was:

17,519 pounds, as before stated.
50 pounds were taken for assay samples—25 on first weighing; 25 on second.

17,469
1,342 pounds, residue from Pilot Charge No. 2 (viz. 1,402 pounds, less 7.5 per cent moisture) were added.

18,811 pounds, total served to vat.

Silver Content.

55,010 pounds fine silver, being 17,169 pounds ore, assaying 0.3149 per cent.

2,187 pounds silver in residue in Pilot No. 2, being 1,342 pounds ore, by 0.163 per cent (mean of four assays, 166, 168, 164, 163 milles).

57,197 pounds pure silver being total content.

Check samples were taken from top of vat, to ascertain progress without emptying the vat:

Fifth day—22 milles = 6.4 ounces per ton.

" " 22 " 0.4 " "

Sixth " 19 " 5.5 " "

" " 17 " 5 " "

The roasted pulp was placed in a vat with a perforated false bottom covered with *manta* (unbleached cotton cloth). Another cloth was spread over the ore and covered with poor tailings. The latter precaution was taken to keep out ore-dust and to filter from the working solution a very small quantity of silver sulphide, which is nearly always suspended in it.

The usual bottom is a layer of broken slag with a layer of jig-tailings on top of it. The result of using the two cloths was that a stream of only say $\frac{1}{3}$ diameter issued from the spout instead of a full stream of $1\frac{1}{2}$; i. e., the filtration was slow. Moreover only one small precipitating tank was used, and the stream, small as it was, was often interrupted. The (filtration) leaching, instead of being completed in four days, took rather more than a week. The first leaching with spring water was suppressed.

The silver precipitate obtained was filtered and afterwards dried four days on sheet-iron plates, over a very small fire. It was then

passed through a 6×6 sieve, and weighed 291 pounds avoirdupois.

Six samples were then taken and portions at once weighed for assay. The reason for weighing for assay without loss of time was that the little remaining moisture might be exactly the same in the assay portions as in the main lot.

The assay results were 18.791 per cent, 18.857 per cent, 18.923 per cent, 18.906 per cent, 18.877 per cent, 18.767 per cent.

We have, therefore, 291 pounds precipitate, assaying 18.852 per cent = 54.859 pounds pure silver. The silver contained in the roasted pulp which entered the vat was 57.197 pounds, and of this we obtained 95.91 per cent. The loss was 2.338 pounds of silver = 4.09 per cent. Judging by the check samples of tailings which have so far been withdrawn from vat, this result appears slightly high.

For the purpose of ascertaining the ley (finesness) of this precipitate as it would enter the cupelling furnace, after being partially roasted in a reverberatory, a small portion was roasted without stirring, in a shallow dish, the residue assayed 26.032 per cent silver. There will be very little expense in refining this substance; the German cupelling furnace will probably be found more suitable than the English one for this purpose.

When our roasters become acquainted with the ore they will be able to use much less salt, and the first leaching for removing soluble salts of base metals can be used. Of late we connect a piece of hose to the water-pipe and allow some three feet of its extremity to lie on the slag, the vat being then filled with ore. As water enters, some is allowed to escape through the spout. In this way the water least saturated with common salt flows away first, and the more saturated portions, on their descent, are diluted, depositing the silver chloride in the ore. It will be remembered that silver chloride is soluble in a strong solution of common salt, but is precipitated on diluting that solution. After washing a few hours in this manner, the excess of the salt is removed, the hose is then pulled away, and the wash completed by allowing the water to enter on top.

Besides the points of detail referred to in the first leaching, there are certain points of management in the second leaching (that with calcium hyposulphite) which also conduce to great economy of material and to close extraction of silver in a very marked degree.

The samples taken from the whole pile of tailings, after discharging the large vat, assayed:

18 milles = 5.2 ounces per ton of 2,000 pounds.
18 " 5.3 " " "
19 " 5.4 " " "
18 " 5.3 " " "
18 " 5.2 " " "
18 " 5.3 " " "
18 " 5.2 " " "
17 " 5.0 " " "
18 " 5.2 " " "
19 " 5.4 " " "
Average, 18 " 5.3 " " "

They were twice weighed:

First weight, 23,395 pounds.
Deduct, 6,387 " = (27.3 per cent moisture).

17,008 "
Second weight, 23,335 pounds.
Deduct, 6,554 " = (23.8 per cent moisture).

17,781 "

We have, consequently, 17,394 pounds of tailings, assaying 0.018 per cent, which gives a silver content of 3.131 pounds, and the pure silver which entered the vat being 57,197 pounds, we have a loss of 5.47 per cent, and this corresponds moderately well with the 4.09 per cent, which was shown by calculating the pure silver contained in the precipitate obtained.

[CONTINUED NEXT WEEK.]

SNAKE RIVER PLACERS.—There is at present some excitement on Snake river over the success of a saving machine introduced by Eastern capitalists, by which the flour gold of that extensive region can be saved and procured in very profitable quantities. It has for many years been a well-known fact in this Territory that the vast gravel bed lying south of the Shoshone falls for over fifty miles contains large quantities of exceedingly light flake gold. In fact, this gold is so light that no ordinary process, as repeated trial has shown, will catch enough of it to pay the expense of operations. The bars are very extensive, and generally lie at different elevations, or on from one to three table-lands bordering the river. The ground has been believed by many to be the richest in the country, but the only test of this has been by very careful prospecting. Sometime last year the attention of Eastern men was attracted thither, and through their interest a machine was introduced late in the fall that made a comparative success, but did not excite general approval until the addition of certain improvements completed its success, and now it is said that eight-tenths of the gold can be saved, and the operation is very practicable. Three large companies of Eastern capitalists have incorporated to work the Snake river gravel beds, and are buying up everything that cannot locate. Many old timers have been doing annual assessment work in that region for several years, and are now offered good sums for their ground. One claim sold two weeks ago for \$27,000, and a portion of another for \$2,500. The ground is very extensive, and should this speculation succeed, and it is probable, the Snake River valley will, in a short time, be the most active, the most extensive, and the most permanent scene of placer mining in Idaho. The resource is exhaustless.—*Ketchum Keystone.*

Foreign Localities of Nickel Ore.

Sweden.

Nickeliferous magnetic pyrites is found abundantly in Sweden, but in general is too poor in the metal to pay for working. The principal works for the extraction of nickel are at Klefra, in Jonkoping (Smaland), and of Sagmyra, in Dalecarlie. The product is an alloy of nickel and copper. The product of 1876 amounted to 790 quintals of nickel speiss, 1,035 quintals of concentrated matte, and 220 quintals of nickel of high grade.

There is also an establishment for the manufacture of cobalt—the Gladhammars Grufve-Aktiebolag (the Gladhammar Mining Company). The mines yielding cobalt ore containing nickel are near the city of Vasterrik, and have been worked since the commencement of the sixteenth century for iron and copper, but since the beginning of the present century for cobalt. The richest ores, containing 10 per cent and over of cobalt, are exported, while the lower grades have recently been treated by smelting for enrichment. The production of rich ore in 1876 amounted to 287 tons, exported chiefly to England, and 1,042 tons of poor ore.

In 1878 this company employed 16 workmen; wages from 2 francs 10 centimes to 2 francs 80 centimes per day. They are lodged gratuitously in houses constructed by the company. The taxes for the year amounted to 160 francs (about \$30).

Saxony.

The clay slate and micaceous district near Schenberg contains over 150 lodes, yielding nickel, cobalt, bismuth and arsenic with a zone six miles in length and about two miles in width. The mines and works date from 1642, and employed in 1873 1,200 miners and smelters.

New Caledonia.

A very important discovery of high grade ore of nickel was made shortly before the International Exhibition in 1876, in the French penal colony of Nonneue. This ore, as found near the sea coast, is chiefly silicate, of the oxide of nickel, free from arsenic, cobalt, or other injurious elements. It is easily worked by the wet or dry methods, and is known as *noumeite* or *garnerite*. The percentage of nickel is variable.

According to Messrs. Christofle and Bonillet the ores from New Caledonia as they reached Europe, in 1876, contained on an average 18 percent of protoxide of nickel, and had the following average composition:

Water.....	22
Silica.....	38
Peroxide of iron.....	38
Protoxide of nickel.....	18
Magnesia.....	16
	100
The same authorities gave at the same time an analysis of the metallic nickel obtained from these ores by the wet method and fusion:	
Nickel.....	97.75
Silicium.....	.54
Carbon.....	1.25
Manganese.....	.30
	99.90

The New Caledonia mines are owned chiefly by a French company, and are worked at a small cost, in part by convict labor. Being near the coast, the ores can be conveniently shipped and cheaply transported to any part of the world. It is fair to assume, however, that like most oxidized ores, they are most abundant at and for a short distance below the surface; and that during the first few years of working the mineral will probably be yielded more rapidly and cheaply than it can be obtained afterwards.

The influence of the ores from the New Caledonia is already felt in the nickel markets, not alone in cheapening the production of nickel and nickel salts and alloys, but also in the improvement of the quality of the alloys of nickel, making them more ductile, tractable, and in every way superior to the alloys made from impure nickel. The use of these clean ores dates from 1876. The ores were shown in great abundance at the International Exhibition at Paris, together with many examples of the greatly improved alloys derived from them. The composition varied greatly, ranging from a few per cent of nickel to 20 per cent. There was for a time an over-supply, ship-loads arriving at the French and British ports faster than required. The ore was already largely used at Christofle's new establishment. He early perceived the great advantages which this new docile ore from the French penal colony offered. He enlarged his works and in reality erected new works on a grand scale at St. Denis, near Paris, and generously invited the members of the international jury to inspect them. This establishment then had a capacity of production of 400 kilograms of nickel daily, say 240,000 pounds annually, but were producing only half of that quantity. Both the wet and dry methods are employed. The richest selected and washed ore is melted direct with carbonate of soda in crucibles, giving metallic nickel, which is granulated in water. The wet process consists in digesting the ore with acids, precipitating the iron first and then the nickel as oxide, which is washed, dried, reduced to sponge, and finally fused with copper to make copper bronze for use in making German silver. This firm had in 1878 a large stock of New Caledonia ore stored away, about 2,000 tons of 10 per cent ore, valued at 500,000 francs.

Spain.

An ore resembling that from New Caledonia is reported by M. Meissonnier to exist in the

province of Malaga, Spain. It is said to carry 8.96 per cent of nickel and no cobalt. It is referred to the species *pinelite*.

New South Wales.

Nickel ores do not appear to be abundant in New South Wales. Professor Liversidge reports a massive variety of copper—nickel of a copper-red color partly incrustated with pale green nickel hydrate, from near Bathurst. Some has also been found on the Peel river.

Copper.

It is nearly a year since Lake copper took a sudden downward plunge, and the reports now coming in rapidly show what business the leading companies did in 1883. To a certain extent it will be possible to arrive at an opinion whether and to what extent the great enterprises on the Lake are capable of facing the competition of the world. In this discussion it will be necessary to exclude entirely the great Calumet & Hecla Company, which produces approximately one-half of the entire quantity of copper on the Lake, at a cost so low that there is not to our knowledge a single concern in the world which can deliver so pure a material at so low a figure. The other mines, in the aggregate, make up the other half of the product—seven mines, the Quincy, Osceola, Franklin, Atlantic, Allouez, Pewabic and Central, each of which makes more than 1,000,000 pounds, turning out together over 21,000,000 pounds. The Quincy mine shipped, in 1883, 6,012,239 pounds of refined copper, against 5,665,796 pounds in 1882, at a gross cost of \$540,038.27 and \$541,407.58 respectively. The cost of production was, therefore, almost exactly 9 cents a pound, as against 9.55 cents in 1882 and 10.03 cents in 1881. Its net earnings, it is true, fell off from \$441,553.85 in 1882 to \$296,031.11 in 1883. The Osceola, in 1882, produced 4,176,782 pounds of ingot at a cost very close to 13 cents, paying \$250,000 dividends in that year. In 1883 it turned out about 4,260,157 pounds of copper, and reduced its dividends to one-half. The Franklin, in 1883, did much better in the way of output than in 1882, turning out about 4,304,615 pounds of ingot last year against 3,264,120 in 1882, when the average cost was 13 cents per pound. It is probable, therefore, that it is in much better shape now than it has been. In 1881 the cost per ton of rock hoisted, including construction account, was \$2.32 for ore yielding 1.42 per cent mineral; in 1882 the figures were \$2.35 and 1.68 respectively; and in 1883, \$2.40 and 1.71 per cent respectively. The reports of the Atlantic and the Central are not yet at hand. Both of them, however, maintained their output, both paid dividends, and both, in 1882, turned out their copper at less than 15 cents. The Allouez produced in 1883 1,751,377 pounds of refined copper, which realized \$265,066, or an average of 15.13 cents per pound, against 17.86 in 1882. The cost, including working expenses at the mine, freight, smelting, and cost of marketing, was \$279,921.44, or 15.98 cents per pound. The Allouez has therefore lost money in 1883, in spite of the fact that the networking expenses per ton of rock mined have been reduced from \$2,2426 in 1882 to \$1,9951 in 1883, the yield of the rock mined having been respectively 0.746 and 0.725 per cent of copper only. The Directors of the company have naturally taken the only step possible under the circumstances looking to a reduction of the cost, that of increasing the facilities for production, and an assessment of \$40,000 has been called for to enlarge the capacity of the stamp-mill by one half and provide for facilities to increase the output of the mine. It is accordingly putting in a third Ball head. The Pewabic, the weakest of the large companies, sold during the year 1883 1,239,740 pounds of copper at an average price of 15.912 cents, realizing \$197,262.36. The agent reports the cost of opening, \$51,179.35, the cost of stoping \$40,774.68, and the cost of treating 57,677 tons of rock stamped at \$52,980.60, a total of \$144,934.63. The agent's drafts were \$240,060.53, and \$19,199.53 were expended for smelting and freight, and \$6,863.74 for brokerage, copper expenses, etc. At the annual meeting this week, it was decided to sell the property for not less than \$50,000, and reorganize under the laws of Michigan. The Huron produced, in 1883, 720,210 pounds of copper from 1.74 per cent rock, at a total expense of \$226,888.98, much of which we presume is due to construction account. The mine is equipped with a second head of stamps, and it is believed that, with a yield of from 125 to 130 tons per month, it can live at present prices. The reports of the younger companies, such as the Conglomerate, Wolverine, Peninsula, and Belt, are not at hand; but they have become or are just about to become large producers, and even should their expectations not be realized, the heavy outlay of capital in their equipment will probably make them heavy producers for years.

Generally speaking, the indications are, that the hard times of low prices are causing a substantial reduction in the cost of production on Lake Superior mines, and that their effect will be presumably rather an increase than a decline in the aggregate product. Any rise in values which the first improvement in business must bring with it, would find the Lake copper mining companies splendidly equipped, and in a position to add largely to their net revenues.

Engineering and Mining Journal.

ENGINEERING NOTES.

THE ST. LAWRENCE TUNNEL.—Mr. J. B. Rouillard, of Montreal, Canada, has been awarded the contract for the St. Lawrence tunnel. The contract provides that the work shall be in condition for the running of trains within three years from its commencement, and Mr. Rouillard is positive that the whole will be finished by June, 1885. Preliminary preparations have already been made, and in a few weeks the working plans will be drawn up. The tunnel is to be about 16,000 feet long, 26 feet wide and 23 feet high, and will contain a double track. The greatest depth will be at the middle, where the rails will be about 76 feet below the level of the bank, the gradient from each side to the middle being less than 105 feet to the mile. The tunnel, according to contract, will be complete in every respect. A permanent system of ventilation and drainage will be established and the electric light used. The immense amount of machinery which will be required will be obtained as far as possible from English and Canadian manufacturers. When the work is in full swing, Mr. Rouillard expects to have some 500 men employed. The price to be paid for the tunnel complete is \$3,905,000. The syndicate, of which Mr. Rouillard is the representative, is composed of nine gentlemen of various nationalities—Canadian, English and Scotch. Mr. Rouillard himself has considerable experience in this sort of work, having been the constructor of several tunnels in the Rocky Mountains.

RAILROADS IN VENEZUELA.—The first railroad built and operated in Venezuela began at Puerto Cabello and led to the westward. About ten miles were built and operated, but enhancement followed, and nothing is now to be seen except a dim outline of the roadbed. About the year 1870 an English company built a two-foot gauge road from Tucacas to the mines of Aroa, a distance of 55½ miles. Poisonous reptiles; wild animals, malaria, and dense jungles combined to obstruct the building of the road. The largest bridge has a span of 90 feet. The ties, bridges, and even the telegraph poles are of iron. The road for its last five miles has a grade of 600 feet, requiring specially constructed engines. The freight cars carry from five to six tons and the passenger cars about 30 passengers. A road from La Guira to Caracas, a distance of 22 miles, has been in process of construction for several years. The track of the road is 3½-foot gauge. It is built on a series of reverse curves having a radius of 140 feet. Surveys have been made for other lines, and a small amount of grading has been done on a road 40 miles long from Puerto Cabello to Valencia.

POWER AND SPEED OF TORPEDO BOATS.—The power required to propel torpedo boats of different sizes is far from constant at all speeds. It happens that Messrs. Jarrold & Co., of England recently had under trial two torpedo boats of different sizes, and as the results may be of interest to our readers, we annex the following facts: The larger boat was 100 feet in length and 12 feet 6 inches broad, having a displacement of 40 tons. The smaller one was 86 feet in length and 11 feet broad, having a displacement of 33 tons. To drive the 40-ton boat 15 knots required 248 indicated horse-power; 33-ton boat 15 knots required 277 indicated horse-power; 40-ton boat 18 knots required 394 indicated horse-power; 33-ton boat 18 knots required 390 indicated horse-power; 40-ton boat 21 knots required 540 indicated horse-power; 33-ton boat 21 knots required 510 indicated horse-power.

NOVEL CURE FOR NOISY BRIDGES.—The Osnabruck Steel Works have recently been manufacturing steel rails eighty-eight feet six inches long, which have been laid down on railroad bridges crossing the City of Hanover, Germany. It was found that the noise caused by passing trains was becoming such a nuisance that a remedy had become a necessity. The cause of it was the violent vibrations at the rail joints, and the engineers hit upon the expedient of having the rails made long enough to cover the whole length of the bridges. Since they were laid down the nuisance caused by the rail joints has ceased. The use of rails of the length stated is, as far as we know, without a parallel in the history of railway construction, and reflects credit alike on the engineers who suggested it and the manufacturers who made them.

FILLING THE SAHARA.—A correspondent of the *Scientific American* has made some calculation on how long it would take to fill the Sahara with water from the Mediterranean Sea. He finds that it would require 4,000 years for the water from the Mediterranean to fill the Valley of the Jordan, which is 1,000 feet below the former, the water to flow through a passage 100 feet wide by 20 feet deep, with a velocity of four miles an hour. With a channel 100 times this capacity it is possible, he says, to limit the period of filling to 40 years. At the same rate it would take 40,000 years to fill up the Caspian Sea to the sea level, and thousands of years to fill up the Sahara.

The Thames is about to have a second tunnel. The Severn resents the attempt at a tunnel by periodically flooding out and drowning the operators; the Mersey tunnel is rapidly becoming a fact, and the projectors of the Huer tunnel promise success.

USEFUL INFORMATION.

Strength of Consolidated Paper.

It is quite remarkable the solidity and strength into which a mass of consolidated paper can be pressed. Paper car wheels are composed entirely of paper rings pressed together under a weight of six tons, and then fastened by means of bolts, and steel tires put on them; then they are ready for use. Laid loosely the rings stack as high as the shoulders of an ordinary man. Under treatment they sink to the thickness required. If the tire should wear or fall off the wheel, or the train run from the track, there would be no danger of their breaking, as they are very flexible and would spring.

A paper ball can be rendered so solid that nothing but a diamond tool can cause an indentation into it. At the mill is a square block of compressed paper fastened on a turning lathe and so hard that if a fine steel chisel is held against it when it is moving, instead of cutting the paper it will break the chisel into a hundred pieces.

The strength is astonishing. You can take a 45 note of the Bank of England, twist it into a kind of rope, suspend 339 pounds upon one end of it, and not injure it in the slightest degree.

Bath-tubs and pots are formed by compressing the paper made out of linen fibers and annealed—that is, painted with a composition which becomes a part thereof and is fire-proof. The tubs last indefinitely, never leak, and put in fire will not burn up. You can beat on them with a hammer and not injure them.

Plates compressed and annealed are very durable. You can not only wash them, but drop them upon the floor and stand upon them. The fork can be used for many practical purposes, and the knife can always be kept sharp.

Paper can be substituted for wood, converted into picture frames and colored like walnut, cherry and the like. Bedsteads are fashioned the same as car wheels, only of long strips instead of rings. They are very beautiful and lasting. Cooking or heating stoves are also annealed, and it is impossible to burn them out. They are less costly than iron. A house can literally be constructed of and furnished with every convenience in paper.

OIL FOR WAGON WHEELS.—A practical man says: "I have a wagon of which, six years ago, the felloes shrunk so that the tires became loose. I gave it a good coat of hot oil, and every year since it has had a coat of oil or paint, sometimes both. The tires are tight yet, and they have not been set for eight or nine years. Many farmers think that as soon as wagon felloes begin to shrink they must go at once to a blacksmith shop and get the tire set. Instead of doing that, which is often a damage to the wheels, causing them to dish, if they will get some linseed oil and heat it boiling hot and give the felloes all the oil they can take, it will fill them up to their usual size and tighten to keep them from shrinking, and also to keep out the water. If you do not wish to go to the trouble of mixing paint, you can heat the oil and tie a rag to a stick and swab them over as long as they will take oil. A brush is more convenient to use; but a swab will answer if you do not wish to buy a brush. It is quite a saving of time and money to look after the wood-work on farm machinery. Alternate wetting and drying injures and causes the best wood to decay, and lose its strength unless kept well painted. It pays to keep a little oil on hand to oil fork-handles, rakes, neckyokes, whiffletrees, and any of the small tools on the farm that are more or less exposed."

CHEAP TELEGRAPHY.—In Great Britain a telegram of twenty words, with the address, can be sent to any part of the Kingdom for one shilling, about twenty-five cents of our money. On the Continent, where the governments have control of the telegraph, the rates are much cheaper. In Belgium and Switzerland, for instance, there are half-franc telegrams—that is something less than ten cents of our money—while in Paris the telegraph system is supplemented by pneumatic tubes carrying post-cards for half a franc. The English Government paid ten million pounds for what was worth commercially not more than seven millions; yet so great has been the increase of business, due to government control, that the shilling rate is soon to be reduced. The address will, as heretofore, be free, twelve cents will be charged for six words, eighteen cents for twelve words, and twenty-five cents, as now, for twenty words. Telegraphing in this country is under corporate control, and we are charged more than any other country on earth.—*Demorest's Monthly.*

COMPOSITION FOR CLEANING MARBLE SURFACES.—An improvement in liquid compounds for cleaning marble surfaces was recently made and patented by Mr. R. F. Dickson, of Atoka, Tenn. This is a cheap and simple liquid chemical compound which can be readily applied and effectually accomplishes the purpose. The compound comprises muriatic acid and clear ammonia, in proportions known to the patentee, which is applied with a stiff brush to the surface to be cleansed, after which it is washed off with water and a sponge, the operation to be repeated should the first application fail to entirely effect the purpose. This compound will be found useful for cleansing any marble, especially weather-heaten tombstones, or any article discolored by exposure and age. Being com-

posed of only two ingredients, it is manufactured readily and at small cost, and requires no skill or special preparation to apply it to the object to be cleansed.

WHAT WILL BURST A GUN.—Some strangely twisted pieces of gun barrels exhibit, in a most interesting fashion, says the *Philadelphia Times*, the vagaries of overtasked gun barrels. The specimens are part of some guns burst by Capt. Heath, of that city, during some protracted experiments with various weapons. Five of the barrels were burst because a ball was "stuck" near the muzzle in each case, two gave way because about four inches of snow was put in the muzzle, two were burst by reason of having some wet sand at the muzzle, and three were ruptured by mud at the muzzle. Sportsmen often scoop up a little mud or sand unconsciously, bang away at game, and are then astonished to find the gun with a ragged and shortened barrel.

AN EASY TEST FOR LUBRICANTS.—The manager of any mill may, at very little expense, determine for himself all the conditions of safety and economy in lubricants as indicated by the standard of heat developed upon any given shaft. The apparatus required for this purpose is merely a thin brass tube closed at the lower end, and two thermometers. The method of using this apparatus is as follows: Place enough water in one of these tubes so that the bulb of the thermometer will be immersed; insert the tube in one of the holes in the cap or the journal, so that the lower end of the tube will be in actual contact with the shaft, hang the other thermometer free alongside, then gauge the relative heat developed with oils and with greases. Each man may thus satisfy himself as to which is best and safest.

SMOKE CONSUMPTION IN LONDON.—Nearly 2,000,000 tons less of coal were consumed in London last year than in the year preceding, and this in spite of increase of population and the severity of the weather. This great reduction in fuel is ascribed chiefly to the anti-smoke question, which has led to the invention and adoption of the best sort of fireplaces. London, as well as New York, Philadelphia and some other large cities, have always been wasteful in respect to fuel. New York ash-carts carry every week from some of the houses of their wealthy people as much coal as would supply a Parisian family with fire for the whole week.

FOR CLEANING BUCKSKIN.—Make a solution of weak soda and warm water, rub plenty of soft soap into the leather, and let it remain in soak for two hours, then rub well until quite clean. Rinse thoroughly in a weak solution of soda and yellow soap in warm water, but not in water only, else it dries hard. After rinsing, wring it well in a rough towel and dry quickly; then pull it about and crush it well until soft.

SAND AND WATER.—The average depth of the ocean is 13,000 feet; and the average elevation of the land 1,000 feet; therefore the total volume of water in the sea is thirty-six times that of the land above the sea.

GOOD HEALTH.

Electrical Medication.

The subject of electric medication is attracting considerable attention at the present time, both from the medical faculty and from the public at large. An edition enlarged and reviewed by Dr. Tipton of Dr. Clark's work upon the subject has recently been issued to meet the increased demand for information in this direction. The author of this work, while not assuming a belligerent attitude toward the other members of the profession, is not afraid to speak out in a manly, independent spirit. He divides all diseases into two classes electrically, "those forms of diseases in which the vital force may be said to be too active, and those in which the vital action is too weak." His "philosophy of disease and cure" is based upon this principle. Yet, while he desires to give full scope to electricity as a remedial agent, he does not ignore the claims of drug therapeutics as an efficient ally, but places them side by side upon an equal footing.

The claims of electricity as a remedial agent was not formerly admitted by the profession, but of late, however, the researches of Dr. Tipton and a few others have placed it in a more favorable light, and many believe that ere another decade has passed the profession generally will acknowledge that in electricity they have found a most important aid to drug therapeutics in controlling most of the ills that flesh is heir to.

Still another new work on electricity in medicine and surgery has recently been made by Dr. Geo. C. Britner, of St. Louis, which purports to be a practical exposition of the principles of electricity as applied to medicine and surgery. The physiological effects of local and general faradization is discussed under the head of electro-therapeutics. The author says in this relation: "Electricity is simply force, and, like other therapeutic measures, must be rightly applied if we expect to accomplish much good with it. To be sure, a mere novice may relieve and cure people with electricity, knowing but little about what is doing, but this is

accidental, and such ignorant practitioners are liable to do as much harm as good."

TEA AND COFFEE.—Fowler & Wells, of New York, have just issued a little duodecimo volume of 120 pages, on "Tea and Coffee: Their Physical, Intellectual and Moral Effects on the Human System." The work was written and published many years ago by Dr. William A. Alcott, and is now republished with notes and additions by Nelson Sizer. This work, when first published, did much to call attention to the effects of the use of these beverages, and in the present form many additional facts are brought out by the increased knowledge which has been gained since the original publication. Part first opens with the history of tea, showing its exhilarating properties, when it was introduced, the amount consumed, and its increase. It is shown to be a medicinal substance, and to have the effect of a powerful drug; also that it is a poison, and produces a tendency to disease. The origin of the use of coffee is also given, with its effect both on the body and the mind. It is shown that some suffer more from the use of it than others. It is the opinion of eminent authority that even a moderate use of these articles produces diseased conditions, and we would recommend those who are using either of the above articles with the thought that they are not harmed, and also those who have not acquired the habit, to procure this little work and read what is said on the subject. The publishers will send it on receipt of price, 25 cents, in postage stamps.

FRESH PAINT.—The current belief among householders that the smell of fresh paint is noxious is founded on pretty general experience, but is opposed by the belief, equally current among chemists, that lead compounds are not volatile. A fact recently brought to our notice seems to support the domestic theory. The basis of the useful and popular luminous paint is known to be sulphide of calcium. Now, this compound, when unprotected by varnish, glass, or some other equally impervious substance, is slowly acted on by the acids of the air, and sulphureted hydrogen is evolved, which blackens lead paint. This is well known, and can easily be avoided by proper protection of the paint. But the curious thing is that unprotected luminous paint is found to be perceptibly blackened by the fumes from fresh lead paint. There seems to be only one possible explanation of this; namely, that a surface freshly covered with lead paint does actually emit some volatile compound of lead. We believe that many physicians could confirm this view from their own observations in regard to newly painted houses.—*Lancet.*

NEWLY BAKED BREAD INDIGESTIBLE.—A French chemist asserts that it is the mechanical state which makes new bread less digestible than old. The former is so soft, elastic and glutinous in its parts that ordinary mastication fails to reduce it to a sufficiently digestible condition. In the course of some experiments in this direction, a circular loaf, twelve inches in diameter and six inches thick, was taken from an oven heated to 240 degrees Reaumur, and a thermometer forced into it three inches. The thermometer indicated 207.5 degrees Fahr. The loaf was then taken to a room, the temperature of which was 66 degrees, and in thirty-six hours it had fallen to 63.5 degrees. In the first forty-eight hours it lost only two ounces in weight. After six days the loaf was again put in the oven, and when the thermometer had indicated that its temperature had risen to 156 degrees Fahr., it was cut open and found to be fresh, and to possess the same qualities as it had been taken out of the oven the first time, but it had lost twelve ounces in weight. Experiments were made with slices of bread with similar results.

SLEEPLESSNESS.—The proximate cause of sleeplessness is plethora of the cerebral blood vessels, and a palliative cure can be effected by anything that lessens the tendency of the circulation toward the head. But a permanent cure may require time and patience. By night studies brain workers sometimes contract chronic insomnia in that worst form which finds relief only in the stupor of a low fever, alternating with consecutive days of nervous headache. Reforming toppers often have to undergo the same ordeal, before the deranged nervous system can be restored to its normal condition. Fresh air, especially of a low temperature, pedestrian exercise, and an aperient diet, are the best natural remedies. Under no circumstances should sleeplessness be overcome by narcotics. An opium torpor cannot fulfill the functions of refreshing sleep; we might as well benumb the patient by a whack on the skull.—[Dr. Oswald, in *Popular Science Monthly.*]

RAILWAY DOCTORS.—On the State railways in Sweden there is generally a doctor for every thirty-two miles of line, and in this way forty-four doctors are employed by the government. The private railways have a similar system. The medical men examine all applicants for employment and reject those physically disqualified, especially by defects of sight or hearing. They also give their services to and attend to all injured by accidents on the line, to regular employees and their families in sickness, to occasional employees while engaged in service, and to laborers in the shops who have paid the same contributions as those engaged in working the line, and also to their families. No exception is made in the case of those who suffer from injury or disease caused by their own fault.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

THE OUTLOOK.—Amador *Sentinel*, April 4: The outlook for mining this year seems very favorable, more so than in any previous year. The rains have rendered it possible to work a number of hydraulic mines that have long been idle or but indifferently worked, and new discoveries of quartz come regularly to hand. The last payment on the \$2,600 bond of the St. Julian was made Monday. The principal amount of money to make these payments has come, we presume, from the mine itself. The mill is now at work on the rock which has been picked over and the bonanza ore selected therefrom. This refuse we are informed pays \$12 per ton, which is more encouraging for a permanent mine than all the rich pockets that may be discovered. All damage has been repaired at the tunnel works in Volcano, and two giants are at work on the gravel beds, the signs pointing to a favorable cleanup. On Aqueduct flat two giants are constantly at work. Messrs. Perry & Co. have struck rich ore in their claim below Pokerville. Various improvements are making in and around the Pacific and Empire mines of Plymouth. Gravel mining on Shake Ridge is progressing finely. More hydraulic mining is in progress in this county at the present time than for several years, the rains which have fallen so plentifully have enabled the working of gravel beds on which no operations have been conducted for some time. These claims are, however, all small in extent and the valley denizens need not fear an overdose of slickens. The Bunker Hill mine at its last cleanup obtained a larger amount of bullion than at any previous cleaning of the batteries—between \$12,000 and \$13,000. Samuel Stewart is prospecting in two places on the Lincoln ground. The work of clearing the Mahoney of water is progressing favorably. J. T. Wheeler has secured the lease of J. Ham to the Modoc mine, in Pioneer district, and is now engaged in working the same. Good pay rock has been struck at the Tellurium mine, Pine Grove.

VOLCANO NEWS.—Amador *Dispatch*, April 12: The times in this vicinity have not materially changed in the way of enterprise. The Downs mine is in operation with a full force of men. The mill is running day and night. Gillick & Phillips are getting out rich rock. They struck another ledge running parallel with the original ledge. It carries free gold. They have struck good rock in the Tellurium also. The mill is running day and night. The Pioneer mines are not doing much. The Tunnel Company have finished their flume and are now ready for action.

ST. JULIAN.—Amador *Ledger*, April 12: The little one-stamp mill at this claim is speaking very encouragingly. A cleanup of a week's run, comprising about 25 tons of rock, was made last Sunday, which turned out \$800 in free gold. The sulphurets will bring the total up to something like \$1,000; an average of \$40 per ton. The previous run on a mixture of slate and quartz, surrendered at the rate of \$15 per ton. The mill is now running on quartz stoped from the end of the tunnel, and seems to be paying equally as well. The ore-body has widened to 18 inches, and plenty in sight to keep the mill going for some time. Sinking the winze to get below the pocket has had to be discontinued for the present, on account of the abundance of water.

SOUTH SPRING HILL.—The mill will be shut down temporarily at the end of this week, on account of having to repair the shaft timbers. Some of them are breaking and if not repaired now, might cause considerable damage. The mine is looking as well as ever.

MISCELLANEOUS.—The header of the big tunnel at Middle Bar is in bunches of quartz, with a strong body of water, indicating a near approach to the ledge. At the Zeile mine arrangements are in progress to move the air-compressor from the mine to the mill, and the rock-breaker from the mill to the mine.

Calaveras.

MURPHY'S.—Calaveras *Citizen*, April 12: Mining in this vicinity has been inactive, owing to a great measure to the extreme bad weather until within the past week. The Oro Plata stamp mill has started up again, and if fair weather continues will be kept running continuously on screenings from the Company's hydraulic works. The new tunnel to tap the large deposit of ore is now in 130 ft. and it is expected that the men at work in it with the ore from other levels will soon be able to keep a larger number of stamps running. George Hengin has struck a good thing within a mile and a half of the Calaveras mine. The lode is from three to five ft wide and assays from \$10 to \$30 per ton. Good reports are given of the Calaveras mine, and the Barleigh is still being pushed on to rich deposits that will in the near future give a good account of itself. It is reported that a sale has been made of the Briston mine, a property belonging to Mr. Webeluth, to San Francisco parties, who intend to go to work at once on the mine. This mine is located within two miles of Murphys, on San Domingo creek, near the Fair Play.

El Dorado.

SEAM.—Georgetown *Gazette*, April 4: Alex. Connell has started up his old seam claim north of town. Alex. is persevering as ever, and don't propose to lay down his pick until he gets what he is after. Work was begun on the ditch to convey water to the Revenge mine on Coloma canyon near Greenwood, about 2200 ft of 11 inch pipe will be used in crossing the canyon. It is the intention of Supt. Dixon to start up the mill early in June.

Mariposa.

COULTERVILLE.—Cor. Mariposa *Herald*, April 11: The mines in this vicinity are booming. Charley Mast, Supt. of the Banderita, says that mine is all right, and that the public may expect cheering results therefrom at an early date. Splendid rock is being taken out. Reports from Mr. Lindsey, Supt. of the Virginia mine, show that this property is looking well. The vein in the upper tunnel shows free gold, generally diffused throughout the whole vein, which is quite large. In the lower tunnel, which is a

continuation of Coe's working, a fair size vein has been struck, which is increasing in size as they go, and is showing considerable free gold. As soon as the mine is fairly open, the ten-stamp mill will be started up, which is standing ready for operations. Mr. Douglass, Supt. of the Cook property, keeps a few men at work on this immense estate. An application has been made to the proper court for permission to sell Dan Cook's interest, and until such an order is made, nothing of any consequence will be done. These mines should be worked, and not be allowed to stand idle as they have for a number of years. A party of mining men spent two days at the Compromise mine recently, and the supposition here is that this property has changed hands. Some very rich copper mines have recently been located on White's gulch, south of Coulterville.

CATHEY'S VALLEY.—Mariposa *Herald*, April 11: Cyrus Thompson has leased the quartz mill belonging to C. Dickinson, and is crushing rock from the Johnson mine. About a year ago 30 tons of rock from this mine was crushed that averaged \$22 30 per ton.

DELTZ MINE.—Cor. Mariposa *Gazette*, April 12: We have lately been washing off the surface and exposing more of the large body of ore in the south side of the hill. There are a great many quartz stratas with casings which resemble coffee grounds, and is washed through the flumes; and the more the mine is worked the better it looks. During the late storm a landslide occurred on the north side of the hill and covered up the new shaft, which, fortunately, was protected with timbers so that no material damage was done. We had already washed up through the flumes the casing and dirt bearing gold taken from this shaft, and the fine quartz which undergoes the process of washing is taken out and thrown into a pile for milling purposes. There are some 600 or 700 tons of quartz in this pile already for milling, some of which was taken out of the mine at an early day by Ellis and others. There are, besides, several hundred tons of coarse or larger quartz which we have not moved from the dumps. The ore on the north side of the hill is considered to have already yielded its \$15 to \$20 a ton by washing, and is yet to mill. There are several hundred tons on the south side of the same sort. The old car tunnel and upper works caved in and the mine has never been worked below the spring water, and there are more than 100,000 tons of ore and vein matter now in sight, which can be profitably worked with water conveyed to the mine in pipes, the line of which has been surveyed. The mine is in excellent condition for more extended operations, and is now ready for a company to take hold and put through a tunnel from the north side—distance, 1,500 ft. and under top of the hill about 400 or 500 ft.

Mono.

MORE STAMPS.—Homer Mining *Index*, April 12: Rumors are afloat that Lundy is to have 35 stamps going the coming season, instead of ten, as heretofore—five additional stamps for the May Lundy group (to be put in as soon as lumber can be had), ten for the Gorilla and ten for the Clifton group. May Lundy, Lucky Morton and Lake View can easily be made to yield an ample supply of ore for fifteen stamps—40 to 50 tons per day; Gorilla can more than supply ten stamps, and the Clifton has in sight a large vein of high grade ore.

BODIE CON.—Free Press, April 15: During the week ending April 12th there were crushed at the Bodie Con. mill 138 tons of ore, and at the Bodie Tunnel mill 304 tons. The average assay value of the pulp is \$49.52, and that of the tailings \$3.60 per ton. At the mine the south drift from the west crosscut, 200-foot level has reached a distance of 25 ft, a gain of 10 ft. Here they expect shortly to make a connection with upraise No. 1 on the Fortuna. On the 200-foot level winze No. 2 has made connection with upraise from 300-foot level. On the 300-foot level upraise No. 1 has been advanced 8 feet; total height 170 feet, without any material change. South drift on the 300-foot level, Fortuna vein, is extended 7 feet; total length 205 feet, with no change. West crosscut from north drift, 300-foot level, has cut the Fortuna vein, which had faulted to the west. The vein is about 12 inches wide, low grade ore. They have started an upraise at this point to prospect the ledge above. North upraise on the 400-ft level has been advanced five ft; total height, 109 ft. The vein is about 3 ft wide but much broken.

Nevada.

LOOKING WELL.—Nevada *Herald*, April 8: Cap. Fleming informs us that his quartz mine which is worked through a tunnel running from Deer creek up under Broad street, is at present looking well and the prospects are most flattering. A three foot ledge has been encountered, from which two men took out 30 tons of ore in eight days. By working back toward the creek, considerable good rock can be taken out that was left untouched while driving the tunnel ahead, but as long as the ledge continues to look as it does now, Fleming says there will be no necessity of drifting into the back ground, it being much easier to take the rock from the regular ledge than from the stringers and chutes that have been passed by. Some rich sulphurets rock has lately been found in this mine and the quality of the ore generally is very fair. The owners contemplate the erection of a mill at no distant day.

ACTIVITY IN DRIFT MINING.—Nevada *Transcript*, April 11: There is renewed activity in drift mining in this and Little York township. Near the Cooper Bros. new saw mill some very good drift diggings are being worked, and prospects in several claims which have just been started up promise good results. The Pioneer Company, of which John Linderman is the principal owner, continues to pay handsomely. This claim has been worked for the past three years, and upwards of \$30,000 has been realized. The gold is very coarse, varying in size from a bit to over \$100 chunks. The largest nugget taken out was worth \$169, and several pieces were valued at from \$20 to \$84. The channel the Pioneer is now working on is from 40 to 60 ft wide. Seth Martin and F. A. Staples have a claim at Mt. Oro, on Greenhorn creek, about a mile from the Cooper mill. They have been running a tunnel, which is now in a distance of 450 ft. Last Monday they struck the rim of a fine body of gravel, and out of two pans of dirt they found several pieces of gold, showing that they had reached the channel. Work will now be pushed and Seth and his partner, F. A. Staples, will soon be on top of the "heap." On Deer creek, below Cooper's saw mill the Red Diamond Company have struck good gravel, but it is being worked

on a small scale. There are several other companies in that vicinity engaged in prospecting and before long we expect to be able to record richer strikes than have heretofore been made. That section of our country will yet show up largely in drift mining claims.

Plumas.

GREEN MOUNTAIN.—Greenville *Bulletin*, April 12: Some delay has been caused in starting the Green Mountain mill by a change of plan in building a track from tunnel No. 6 to the mill. At first it was determined to build only a temporary track, and some work had already been done, when from further advancement of work in the mine, it was resolved to change the plan, tear down what had already been done, and rebuild in a more substantial way. Heavy timbers were then got out, and a permanent road made on very strong trestle work from the dump at the mouth of the tunnel to the mill. This work is now almost completed, and the mill will certainly be started by the end of this week, or beginning of next.

San Bernardino.

PROVIDENCE.—Cor. Calico *Print*, April 12: We found the Bonanza King in full blast, 110 men on its pay-roll. To the new-comer the camp must present a decidedly "broken down" appearance, for the debris of burnt buildings, of others left half completed and falling to decay, would naturally convey that impression. However, a closer inspection into its affairs, corrects this and brings one to a conclusion the opposite. The ore teams passing loaded to the eaves with good average ore, and the continual rattle at the lower town where it is crushed are signs of prosperity, patent to all. We visited the other day the claim of R. P. Kerr, the Perseverance, located 2,000 ft north of the Bonanza claim. Mr. Kerr, has as fine a body of ore in sight as we have seen in many a day. In character it resembles that of the Company's mine. Mr. Kerr's vein is about eight ft in width, and is good milling ore throughout. Our impression, after several days spent in search of information relative to the mines about here is, that Providence is good for many a day yet, and it is our belief that the mineral resources of the district lack very much of full development.

CALICO DISTRICT.—Calico *Print*, April 12: Work is progressing on the Invincible mine on the surface. Small quantities of ore are being taken out daily, and several lodes have been milled recently. The last lot milled \$68 to the ton.

RED JACKET.—Mr. A. Barber has leased that portion of the Red Jacket mine not in litigation. The agreement entered into between himself and the owners is that he is to have three months in which to prospect the mine, without paying for the privilege, in case the mine does not show up well at the end of that time. If the result of his prospecting proves satisfactory to him he will continue operations under a two-year's lease, including the three months prospecting. Mr. Robt. Dougherty has been employed as superintendent, and the work of prospecting has commenced in earnest. Dr. Ghiselin is negotiating for the Geneva group of mines, about a half a mile east of Calico. He has paid part of the money down, and it is expected the sale will be completed soon, when active operations will be commenced to develop these mines. Work still progressing on the Kearsage mine, with favorable results. Two tons of first class ore, that sampled over \$2,700 to the ton were brought to Calico the other day to be stored away in a safe place. The prospects of the mine continue as bright as ever.

Messrs. E. Stacy & Co. have leased the Mark Twain mine and have several men employed in opening it up. Sinclair's mill is ready for the machinery, which is expected to arrive in a few days from Los Angeles. It will not take long to put it in place so that it is probable the mill will be ready for operation in about three weeks. All the principle mines in the camp are looking well, and are employing their usual number of men and producing their usual quantities of ore.

Sierra.

CLEANUP.—Mountain *Messenger*, April 10: The Bald Mountain Extension Co. Sunday cleaned up 143 ozs., averaging \$2 25 per carload. J. Hauber, of Alleghany, had a cave in his tunnel, recently, that caused a stoppage of work. He has a good ledge. Seventy-nine ozs. of gold was the Ruby cleanup last week, and for the one previous, eighty-one. The main tunnel of the Rainbow is in 900 ft. The rock is not hard, and about 40 ft a week is easily made. A seven-ounce specimen was found Monday at the Ruby, by Supt. Colman.

THE RUBY MINE.—Sierra *Tribune*, April 10: Fifty-two men are employed at the Ruby mine at present. The bedrock throughout the mine is very hard, necessitating blasting. Six gangways and four breasts are opened out. The latter number will be increased soon. Most of the gravel taken out has to be hoisted by windlass up an incline forty-two ft. Two pumps set in the main tunnel drain the incline. These are worked by boys. Week before last the caving of an old breast increased the flow of water, and for three days and nights men were kept constantly at the pumps in order to keep the incline from being flooded. The ventilation throughout the mine is splendid. Two weeks ago 81 ozs. of gold were cleaned up, and last week 79 ozs. was the result. The lead has recently changed its course to northeast. Taking into consideration the many difficulties under which work is being carried on at present, a great deal of credit is due Supt. Coleman for the fact that the mine is being made to produce more than expenses. The Bald Mountain Extension Co. cleaned up 143½ ozs. of gold Sunday, as the result of the past week's work in the South Fork ground. The main tunnel in the Extension mine is now going ahead by day work. This winter F. J. Hauber has been engaged in running a lower tunnel on his ledge near Alleghany. During the last storm the tunnel caved and he was forced to abandon work in that quarter for a short time. In the meantime he has been crosscutting the ledge on the surface in various places. The ledge averages about six ft in width and prospects splendidly.

Shasta.

LUCKY ESCAPE.—Shasta *Courier*, April 12: Last Wednesday, as Mr. Sharp, a workman in the Iron Mountain Mine, was standing on the hoisting cage the pin which held the windlass stationary gave way and the cage dropped to the bottom of the shaft, a distance of over 100 ft. The miner was hoisted out considerably bruised and badly shaken up, but we are informed that his injuries are such as he will re-

cover from. Some months ago Sharp was caught in a cave in the same mine and one of his legs broken.

Trinity.

QUARTZ EXCITEMENT.—Trinity *Journal*, April 13: Two ledges have been discovered on the Wes, Weaver, about a mile from town, within a few days from each of which good prospects have been obtained. On Tuesday the entire hillside there was covered with white-shirt prospectors from town and it is likely the fever would have continued for several days if the rain had not interfered. As it is a large number are only waiting for a clear day to resume the hunt for extensions and new lodes. West Weaver was originally a very rich stream and all the gulches putting into it on the west side paid well in quartz gold up to a certain height above which nothing could be found. Large pieces of rich quartz were found by the early placer miners, from one of which about \$700 was taken, and it has always been a firm conviction with those acquainted with the section that some day a rich ledge was certain to be discovered there. The new prospect was found in the bed-rock of a placer claim, some 30 ft below the surface, and as the lode is well defined, good sized, and prospects rich, there is a reason to expect that it will prove a veritable bonanza. The indications are most encouraging.

NEVADA.

Washoe District.

ALTA.—Virginia *Enterprise*, April 12: The east drift on the 2100 level has probably 130 ft yet to go to get under the point where the vein should be found. The ground continues of a favorable character, and there has of late been no special increase of water.

GOULD AND CURRY.—The drift on the 2700 level is being pushed forward as rapidly as possible though the heat still continues great in spite of the blowers. On the 2200 level the drift from the Bonner shaft is making good headway toward the Con. Virginia line. At this point it will be taken by J. P. Jones and others, who will proceed to mine the California and Con. Virginia upper levels for low grade ore.

UTAH.—The fan is running all right at the new station on the 1950 level and at a point 200 ft north of the main incline a north drift has been started which is showing some very promising streaks of quartz.

MEXICAN.—The engine is in place at the winze on the 3100 level and good headway is being made in sinking. Thus far the formation encountered is vein material, with some streaks of quartz.

SIERRA NEVADA.—On the 3100 level a west crosscut has been started at a point 80 ft north of the winze, and is cutting vein material showing some fair streaks of quartz.

BEST AND BELCHER.—The drift on the 2700 level is being pushed as rapidly as possible, but the ground is still quite hot, and will probably continue so until connection is made, though air is carried in by means of pipes of large size.

HALE AND NORCROSS.—The south drift on the 2800 level has connected with the main west drift from the Combination shaft and the two drifts are now being properly enlarged and timbered up, a work which will soon be completed.

COMBINATION SHAFT.—The west drift on the 2800 level has connected with the southeast drift from the Hale and Norcross and the connection is now being enlarged to its full size and properly timbered up.

OPHUR.—On the 150 and 250 levels are extracting ore and are at the same time pushing crosscuts in various directions; also an upraise is being made on the 250 level.

UNION CON.—The water is being allowed to drain from the several drift holes in the ends of the drifts on the 3100 level and a west crosscut will soon be started.

CALIFORNIA.—The east drift on the 2700 level, joint with Con. Virginia is being pushed as rapidly as possible in ground that works very well.

CON. VIRGINIA.—On the 2700 level the east drift joint with California is being pushed as rapidly as possible and in ground that works very well.

YELLOW JACKET.—The old upper levels continue to yield about the same quantity of ore, and the mills are kept steadily running.

BELCHER.—The several drifts on the old upper levels continue to yield well, and the mills are all kept going.

ANDES.—The usual prospecting work is being done, and some ore is being taken out that will pay for milling.

IMPERIAL.—Some ore that will pay for working is being found in the explorations on the old upper levels.

CROWN POINT.—The usual amount of ore is being extracted and all the mills are running regularly.

SAVAGE.—There is still a considerable flow of water from the north drift on the 2600 level.

UNION SHAFT.—Are repairing the drain drift leading out to the Sutor tunnel on the 1600 level.

Columbus District.

MOUNT DIABLO.—True *Fisura*, April 12: Winze No. 5 is now down 135 ft, and show no change of note. The south crosscut from the Callison winze, the intermediate between the second and third levels is in 44 ft and shows ledge matter in the face. The upraise from the third level has been connected with the winze from the second level and this completes the incline to the third level. A station is now being cut out for a dump on the third level. Below the third level the incline has been sunk 15 ft, the total depth below third level being 62 ft.

COLUMBUS CON.—The west drift, from the winze on the second adit level, has attained a length of about 20 ft, and a quantity of high grade ore is being extracted from the same. The work in crosscut No. 2, from the main drift on the 150 level, has been resumed, its present length being 35 ft. No work is being done on the first level at present.

ORE.—True *Fisura*, April 8: It is reported that the lower mill at Belleville will soon be started on a lot of 3,000 tons of ore from Mono county. A. G. McAfee has been prospecting in the Blue Light copper mine for the past two months. This is the same mine which furnished the ore that was smelted at Soda Springs about a year ago, when operations were suspended for want of sufficient ore. Mr. Mc-

Mee is employing five men and has already developed one small, but fine looking body of ore. The larger and better deposit which pinched out is being drifted for, and present appearances would indicate its being found again at an early date. The situation at present is very flattering, as spoken of by the Superintendent, and everything points to the resumption of smelting early in the coming summer.

Bristol District.

DAY.—Pioche Record, April 5: The ore lately encountered in the Day is of better class than has been found in the mine for a long time. The new find was made in a drift being run to the east on the fourth level, following up a small, flat seam of crystallized carbonate ore. The find is a virgin ground. After following the seam a short distance, it turned up, and has been upraised on for 51 feet. The width or extent of the body is not known. The crystallized carbonate, at one point, has been dug into for 15 ft. The assays of this went from \$47 to \$628 in silver, from 8 to 73 per cent in lead, and from 5 to 27½ per cent copper. At the top of the upraise the iron ore has commenced appearing, and is most likely the top of the ore chamber. This ore can be extracted at a cost not to exceed 50 cents per ton. A chamber of high-grade ore cannot be too large in its dimensions.

Highland District.

HAMBURG.—Pioche Record, April 5: The old abandoned Hamburg, of Highland district, now the property of the Day Company, has improved greatly the past week. The large flat ledge of low-grade rock that has been run on for some time has taken a change. The miners have arrived at a point where a part of the ledge shows upwards, while the other keeps on and has a downward tendency. A box of nice-looking ore, some of the pieces being composed mostly of galena, was brought to town on Wednesday. It was said to have been an averaged sample, and would go \$80 in silver. It is believed by the miners that the ledge is making a large deposit of ore near by. At the Mendha mine the allotted amount of ore is daily extracted, and the ore body continues looking healthy, and exhibits no signs of weakening.

Mount Cory District.

CROPPING.—Walker Lake Bulletin, April 12: Work on the Junio tunnel has been suspended for a few days on account of the illness of the foreman. Supt. Shafer reports a cave in the Enterprise tunnel, which will delay work about a week. Coryville is getting on its good clothes. The snow is nearly gone and the green grass is beginning to show. At present the only tunnel at work is the Josephine, but they will all be under headway again in a short time.

Oseola District.

WATER RIGHTS.—Eureka Sentinel, April 8: We have it on good authority that Godbe & Hampton, of Salt Lake, have been trying to purchase from the Oseola Company the water rights which the latter have obtained for about \$25,000, with the view of extending their purchases of small-water courses and bringing them into Oseola on the extensive placers that now exist. As to the success of Godbe & Hampton we have not been apprised. It is uncertain whether the present holders of the water rights want to get more than the \$25,000 they have paid out for them and were only waiting for a bargain, or whether they intend to utilize their rights for themselves. Our informant states, however, that the bringing of the water into the camp for sluicing is only a question of time, for, he says, though the quartz mines in the camp show well, the placers are certainly rich and extensive, as the working of a few men in a small way for years has proved beyond a doubt.

Pioche District.

MEADOW VALLEY.—Pioche Record, April 5: The Meadow valley property was sold on Monday, J. Eisenmann purchasing the mine, consisting of 1,800 ft of mining ground, and the works, while W. E. Griffin bought the mill and the millsite.

Rebel Creek District.

NEW COMPANY.—Eureka Sentinel, April 14: Several Eureka men are interested in mines in Rebel creek district, or, as they are commonly called the Willow creek mines. They have incorporated under the name of The Mayon Mining Company. Monday last, at a meeting of the stockholders and trustees, A. L. Fitzgerald was chosen President; P. N. Hansen, Vice President; W. O. Mills, Jr., Secretary and Treasurer, and William Mayon, Supt. The company owns five locations near Willow creek, which promises exceedingly well, though as yet undeveloped. Several very rich specimens have been taken from them. The company intends to go systematically to work on a prudent basis and develop their property, and, if the results are as anticipated, they will soon have a splendid paying investment. In about two weeks Mr. Mayon will commence operations. This is a company that means business, and we are satisfied that Mr. Mayon, Supt., is as good a man to put in charge as could have been selected. We hear good accounts of Willow creek, and we hope soon to hear that the Eureka investors are in bonanza.

White Pine District.

Work for the time being is partially suspended on many of our prospecting claims, for the reason that provisions and material cannot be got to them, and some of them fill up with snow as fast as cleaned out. Mr. Kendall's force is laid off now for that reason. We look for a revival of mining and business interests here as soon as the spring fairly opens, and the snow gives our people a show to move about.

ARIZONA.

MOHAVE ITEMS.—Miner, April 5: James Carr, the boss freighter of Arizona, has taken a contract to haul ore from the McCracken mine to the mill at Signal. The road engine is still at work hauling rock for the purpose of macadamizing the road which will take some months yet. The Lester Mining Company's mill at Signal will start up for good about the first of May. P. F. Collins is about to commence work on one of his claims near the Moss line in San Francisco district. He will start out in a few days. From A. E. Davis who has just returned from a visit to the Elkhart and Schuykill mines at Chloride we learn that everything is progressing favorably and the ledges looking well.

PINAL NOTES.—Drill, April 5: The clear open sky that now smiles upon us has revived activity and enterprise in the Territory and the temporary suspense of business promises to be of but short duration.

The Windsor mill is now in the hands of the Silver King Company and active renovation is going on under the charge of Chief Engineer Kenney. It will soon be in apple pie order and of use in profitable work. Mr. Wheeler has closed his work on the "Eureka." He has a large quantity of ore on the dump, but as the Windsor mill was leased to the Silver King Company he has no chance to work and therefore shut down. The mine looks vastly better than formerly. In the depths of the Mowry they are still exploring and persevering with a most admirable pluck. The "Lost Prize" is still holding out its silvery rays from Treasure in the deep. Prospectors are becoming active and the burro with its pack is seen frequently over the trails. Silver King is lively and full of miners who are daily thriving amongst the rocks, and many a prospect shows the nearer approach to fortune with the work done around the King. There are some hopes of the "Goodenough" Company being revived and active. At Owl Head the Jessie Benton mill is running steadily. The machinery for the "Speciepaying" will now soon reach the mill at Cottonwood.

HASSAYAMPA.—Prescott Courier, April 11: R. W. C. Merington, of the Senator mill, Hassayampa district, and Jacob Gattoni, of the "Bonanza" Grigione mine, reached Prescott, yesterday, and shortly afterwards found their way to the Courier office and let us look at large pieces of ore from the aforesaid mine, which is about one mile east of the Dosoris. The ore is of a bluish cast; carries between \$200 and \$300 per ton in silver; also, \$40 in gold. The mine was recently found. It is situated so that short tunnels strike it, several hundred feet below the surface. The ore will be sacked and shipped. The gentleman who has leased the Holmesite mine has taken out 20 tons of second class ore, which, we learn, assays at the rate of \$325 per ton. He has, also, about four tons of first-class ore, which will yield upwards of \$5,000 per ton. The Holmesite belongs to John Holmes. Mr. Mahoney, of Placerville, tells us that miners on Hassayampa creek are doing remarkably well, as are those in Weaver district and in Copper Basin.

THE LANE DISTRICT.—Arizona Miner, April 11: In mining circles the above-named district is being prominently mentioned as being destined to enjoy an early and lasting boom. From reliable parties who have recently visited the section we glean the following: The Black Warrior is at present down 200 ft, with its north drift in 450 ft. It is being constantly worked, with high grade ore everywhere in sight and never was more promising in appearance. Northern Pacific has one shaft down 50 ft, and work is being done on a 100 foot shaft from which drifts will be run each way. The Hayden Bond is down 100 ft with drifting going on, and over 400 tons of ore on the dump. Work is being done on roads leading from these mines to the Tuscania mill, by which the ore will be worked as soon as transportation can be had, and over 150 men will then find in the district constant and profitable employment.

COLORADO.

NOTES.—Gorogtown Courier, April 12: The total shipment of ore from Gorogtown during March, was \$100,787.95. Work has been started up on the Michigan tunnel, just below the Shively mine. Shay & Co. shipped three car loads of ore from the Mendota last week, and Hood & Co. shipped three. Barrett & Fletcher are running 20 stamps in their mill at Empire, on ore that averages about \$50 a cord. Mr. R. O. Old has leased the Frostburg lode to Hambly & Co., who are at present engaged in driving the adit. The Victoria tunnel, run to cut the Mendota and other lodes, is now in 506 ft, and will cut the Mendota in about 300 ft, at a depth of 450 ft. The tunnel was driven 80½ ft during March. The Albino mine, at Damont, shipped 12 tons of smelting ore last Saturday, and shipped 47 tons during the month of March. A good vein is exposed at the bottom of the shaft, and 21 inches in the breast of the lower level. Nine cars of ore were shipped from the Mendota last month, the net weight of which was 90 tons 833 pounds. Gross value, \$6,631. Four cars, or about 40 tons, were shipped last week, valued at \$3,500, making a total output from the Mendota during March, of over 130 tons, and a gross value of over \$10,000. Okham & Co., lessees on the Joe Reynolds No. 2, had quite a large mill-run last Saturday, the 1st class of which returned 491 ounces, 2d class 300 ounces and 3d class 140 ounces per ton. The ore came from the lower level, 90 ft from the surface. A mill-run of \$1,881 from No. 1, of ore was taken from 900 ft from the surface, shows the ore to be of uniform high grade: 1st class 360 ounces, 2d class 155 ounces.

IDAHO.

VIENNA.—Ketchum Keystone, April 5: It is said that the Vienna Mining mill company, at Vienna, employ about 100 men on their mines and mill. The wages paid that number of men, a portion of them working every day in the week, will amount to at least \$25,000 per week. The cost of timbers in the mines added to the cost of wood consumed by the mill—seven cords daily at \$3.50—will amount to about \$240 per week. The cost of transporting ore from the mine to the mill averages \$1.75 per ton, and as the mill by ordinary operation will put through 20 tons daily the weekly expense of hauling amounts to \$352. Thus the cost of the entire mining and milling operation excepting the cost of chemicals, amounts to at least \$3,000 per week or over \$12,000 per month. This is the extent of a single winter operation in the Wood River country. It is now said that the Vienna company employs 20 additional men, making the weekly expenditure for labor about \$550 additional. The ore of the Vienna and Mountain King mines operated by this company is chiefly ruby-silver bearing.

MINNIE MOORE.—Wood River Times, April 9: Yesterday three carloads of Minnie Moore ore were shipped to Omaha. This was only one of the regular shipments from this famous mine, as the managers intend to ship a like amount daily for some time. The second payment will be due on the mine by the 20th instant, while the third payment will not fall due for some time; but it is probable that the purchasers of the mine will pay for it in full this month, as they are anxious to work it more energetically. By the contract of purchase, they cannot extract over thirty-five tons per day until the

second payment shall have been made, nor more than fifty tons per day, between the second and the third payments. The managers wish, however, to work the property vigorously, and in order to do so they will probably pay for it this month. If they do so, they will at once, it is stated, increase the force at work to a complement of 150 men.

HALF A MILLION.—For a day or two past rumors of the sale of the Idahoan mine for half a million dollars having been afloat on the street, a Times reporter asked Supt. Turner yesterday if the mine was really to go this time. Judge Turner said he did not know. Himself and partners had fixed a price on the property, and experts in the interest of the intending purchasers were examining the property. If it suited them they would doubtless buy, as they seemed to mean business. The Idahoan is one of our banner mines. Three years ago it was offered at \$100,000, but the party having the option having been too slow, when he offered to take the mine he was asked \$150,000. The following year \$250,000 was asked of Morton C. Fisher, who deliberated some months, and finally asked for a bond, which was refused. Last year some representatives of an English syndicate wanted it, but would not pay over \$350,000 for it, while the price asked was \$400,000. This year the figure is doubtless at least \$500,000, and the Idahoan, being undoubtedly a mine, is cheap at the price.

THERE IS GOLD.—Coeur d'Alene Nugget, April 5: The assertion is frequently made by croakers that no disinterested party has ever had any proofs that gold came out of the Coeur d'Alene mines. In future we shall brand such statements as falsehoods. We were present last week when George B. Ives cleaned up his sluices after a two days' run. A strip of ground, or pit, about 10 by 15 ft had been partially cleaned. The work had not been finished, as much loose dirt still covered the bed-rock, and the crevices of the rock had not been dug out. At our request, however, Mr. Ives consented to make a partial cleanup. We had asked Mr. Ives as we watched him shoveling the dirt into the sluices, if a shovelful or pan of dirt would show a color. He looked up with an amused smile and said: "I guess I can do better by you than that. Come down here?" We descended into the pit from which he had been shoveling. He took a small pail and dipping up water poured it upon the bed-rock where they were working, and washed away the loose dirt. In the crevices, numbers of pieces of gold were found, the largest being worth a dollar, and two others half a dollar each. One of these specimens can be seen at the Nugget office. After seeing such an exhibition of the paying qualities of the dirt, we asked to see the cleanup. Two men had worked two days. The upper and lower riffles in the string of sluices were not disturbed, and no attempt was made to clean all the gold from the sluices. It was only a partial cleanup, but the result was \$74.25, or \$18.55½ per day to the man. We saw the gold taken from the boxes, panned out, dried, cleaned and weighed. One piece was weighed which was worth \$1.25, and numbers of other pieces were nearly as heavy. It was all very coarse. Mr. Ives says that the largest nugget ever found on his claim was worth \$2.50, the nugget being, as a rule, much smaller than those found in other claims. The first panful of dirt taken from the bed-rock by Mr. Ives, on the ground abandoned by the Californians, yielded 25 cents. Lou Wyant tried a panful with the same success. A discussion arose as to whether the gold came out of the gulch, or had been washed from a bar further up the creek. Mr. Ives inclined to the latter theory and his claim now includes the greater part of the bar. Last season he dug a ditch some 200 rods in length and sluiced off a pit about 14 by 75 ft. There was not sufficient water to ground sluice the waste dirt off to advantage, and he did not make wages. From the pit he took out \$400. It was on the rimrock between the bar and the channel of the creek. The rimrock paid better the lower down he got in the channel. On the opposite side of the creek, on the rimrock, Mr. Ives saw three men pan out \$50 in one day. The channel is about 30 ft wide, and the bed-rock lies about five or six ft from the surface. Mr. Ives will work out the channel this summer. He thinks he can drain the bedrock in the bottom of the creek by digging a 500-foot ditch. If fall enough is not obtained in this distance, he will have to go 630 ft. He does not believe the ancient channel is identical with the present bed of the creek, but thinks it is back under the bar. He is careful not to wash any dirt or tailings into the creek, however, as he is confident the present channel is exceedingly rich. He does not wish to sell his claim, saying that he has mined 20 years and now has found a claim that he is willing to settle down upon and work at his leisure. Parties ask him every day to place a price upon his claim. The invariable reply is: "Blanket it with ten dollar notes and I'll take the blanket." He does not intend to ground sluice the waste dirt, because his dump will cover up valuable ground. He will drift, instead, only take out the pay-dirt. By doing so, he can work all winter, and take the gold from every foot of his ground. He is indifferent regarding the rush to the mines, and would not care a straw if a stampede should occur. He is interested in no boom, and the favors shown us were simply acts of courtesy, without any reference to what would be written for or against his mine.

THE STATUS OF THE MINES.—Coeur d'Alene Nugget, April 5: The warm weather and rapidly melting snow has set the miners and prospectors at work in real earnest. Picks and shovels are being called into lively requisition, and miners can be seen panning dirt at many a turn of the creek, rockers and sluices are busy, and considerable dirt is being washed. The towns are comparatively deserted, but the claims are becoming peopled with men. Cleanups have been made, but while the results are evidently of a satisfactory nature, it is difficult to get figures and exact amounts on account of the many disputed titles to claims. Enough is whispered about the camp, however, to show that the beginning is better than the miners generally anticipated. In any claim parties will lend a person a shovel or pan, and with either gold can be shown. It is generally coarse shot gold, with frequent nuggets, and exists not only on the bed-rock but in the gravel for a foot or two above bed-rock. We have been careful not to write this heretofore, because we wished to see with our own eyes. Only a few of the claims are opened up, but those few, without a single exception, so far as our knowledge extends, are prospecting well. That there is pay dirt here is an undisputable fact. How much of it, or rather, how much of the

district it covers, is a question for the future. Gold is being brought in and sold every day in small quantities. It will be a month before the work of mining will have fairly commenced, though work is now being prosecuted on a large number of claims, and others are being prospected. April will see the ground cleared of snow. May will see lines of sluices laid and miles of ditches cut. June, July and August will tell the story. It is nonsense to run the camp down, as some of our outside contemporaries are doing; it is criminal to write it up, to boom it, as the Northern Pacific and a few subsidized papers are doing. The man does not live who can say he knows of his own knowledge that the district is not the richest ever discovered. On the other hand, no one can pretend to know that the amount of gold to be taken out will be anything like adequate to the excitement. The Nugget will denounce the mines as soon as there is anything to warrant such a course. It will give facts, however glowing, when they are clearly substantial. Our readers can depend upon a fair, honest statement of the case. When we see ounces of good solid dust, as we have on many occasions, and have proof that it came from certain ground, it is difficult to keep from enthusing. But we remember that such gold may be found in only a few places, and that thousands who come here will be financially ruined if they are misled, and we curb our enthusiasm and patiently await developments.

MONTANA.

THE MARIA MINE.—Butte Miner, April 9: Recent developments in this mine have proved it to be one of the best mining properties in the district. The Maria is situated one-half mile north of the Alice. Its owners, the Larmour Brothers, have been quickly working the property for years, feeling assured they had a veritable bonanza within their reach. At present the property is under lease to Frank Pink & Co., until the first of August next. During the winter the output has run from 100 ounces to 119 ounces. Quite recently, however, in stopping from the 125 level to the 75 level the lessees struck a body of ore of extraordinary richness. The returns from the Colorado smelter of a lot of 17 and one-half tons of first-class ore just smelted there showed 284 ounces silver to the ton, and 52½ second-class ran 85 ounces. A contract has been entered into for the erection of a 10 stamp mill, with roaster, on the property adjoining the Maria on the east. The mill will be built by English capitalists.

WARM SPRING MINES.—Coeur d'Alene Northwest, April 8: I visited the new diggings yesterday called the Cella Gordon mining district. There are quite a number of people there, and about 40 locations have been made. The project of taking claims on the 20 acre plan was not consummated. The laws of the district allow each location but 225 ft from rim to rim rock. The claims taken are mostly below the Falls. There are but few claims taken above—four in all I believe. Next Saturday (April 12th) is representation day. All claimants are expected there then to represent, and it seems after that time all claims not represented are "jumpable." They have commenced a ditch two ft wide, about same depth, and have completed 220 ft. It seems there must be something there or they would not go on with the ditch.

UTAH.

REVIEW.—Salt Lake Tribune, April 11: The week has been a quiet one in mining circles, notwithstanding the somewhat settled weather and the apparently swift oncoming of spring. The receipts of the week amounted to \$101,663.52 in bullion and \$5,000 of ore; total, \$106,663.52. For the week previous the receipts were \$121,275.92, of which \$112,455.92 was bullion. The shipments from Salt Lake City for the week ending April 5th, inclusive, were 998,136 pounds. The shipments of Horn Silver for the week were 13 cars of bullion, valued at \$39,000, bringing the total product of the Horn Silver to date for the previous year, \$570,000. The Ontario shipped during the week 32 bars of bullion, \$37,333.32; total, for 1884 to date, \$465,903.10. The Crescent sent down for the week, three lots of ore aggregating in value \$5,000, being all the ore received. The Stormont forwarded three bars of silver, \$4,630. The product of the Hanauer smelter for the week was ten cars of bullion, \$20,700. During the winter much development work was done at the lead mine, Bingham, and some first-class ore was shipped, but most of the time the heavy snows prevented operating the tramway, and the concentrating mill was idle. To-day the mill will commence its season's work, under more favorable auspices than ever before. In the mine large ore bodies are in sight, and of better quality than that taken out last season. The mine and mill have a full force of men, and everything looks promising for a larger output than heretofore in the history of the mine.

OREGON.

NOTES.—Jacksonville Times, April 11: Water is decreasing fast and most of the miners are engaged in cleaning up. Ingram & Dean, of Willow Springs, commenced cleaning up this week, having washed off a considerable amount of ground. Keaton & Klippel, of Poorman's creek, are able to pipe three hours a day with the aid of their reservoir. A number of other miners are also doing some work through reservoirs. M. Hoover, of Jackson creek, has struck unusually good prospects, and he is of the opinion that he has found the old channel which paid so enormously in former days. There is a large amount of snow at the head of the Sterling Co.'s ditch, which is slowly melting and affording a good supply of water. Supt. Ennis expects to make a several months' run. The season has been considerably of a failure for many of the miners, owing to the scarcity of water. Some of those who rely on the rains altogether have been able to make a short run, but generally they have been disappointed, we are sorry to say. The enterprise inaugurated by Messrs. Simmons, Ennis & Cameron, near Waldo, is progressing satisfactorily, and we expect to announce before very long that they have commenced mining operations. They are not employing as many men as usual, the force of the water cutting a channel in good shape.

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MANUFACTURERS OF IMPROVED AND APPROVED FORMS OF

MILL AND MINE MACHINERY.

Having made extensive additions to our Shops and Machinery, we have now the LARGEST and BEST APPOINTED SHOPS in the West. We are prepared to build from the Latest and Most Approved Patterns,

QUARTZ MILLS

For working gold and silver ores by wet or dry crushing. The Stetefeldt, Howell's Improved White, Brunton's & Bruckner Furnaces, for working base ores. Rotary Dryers, Stetefeldt Improved Dry Kiln Furnaces.

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Water Jackets, either Wrought or cast Iron, made in sections or one piece, either round, oblong, oval or square. Our patterns most extensive in use. SPECIAL FURNACES FOR COPPER SMELTING. Slag Pots and Cars, Improved form. Bullion and Copper Moulds and Ladles, Litharge Cars and Pots, Cupel Furnaces and Cars.

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Large or Small for flat or round rope. Double Cylinder Engines, from 6x10 to 18x60. This latter size furnished J. B. Haggin or Olant and Old Abe Co., Black also Corliss Pumping Engines, 26x60, for Hoisting and Pumping Works, for 2,000 feet deep. Baby Hoists for Prospecting, 4 H. P. to 6 H. P.

Wire Rope, Safety Cages and any Size and Forms of Cars.

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Coarse Concentrating Works, Improved Jigs, Crushing Rollers, Sizers, Trommels, Rittenger Tables, and adjuncts for the proper working of Gold, Silver and Copper Ores, complete in every detail. HALLIDIE IMPROVED ORE TRANWAYS. We refer to Gen. Custer mine, Idaho, 5,000 feet Columbus Mine, Col., 4,750 feet long; Mary Murphy mine, Col., 5,000 feet long, all in constant operation.

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CORLISS ENGINES from 12x36 Cylinders to 30x60. PLAIN SLIDE VALVES from 6x10 to 36x36. Of every form, made of Pine Iron Works C. H. No. 1 Flange Iron, or Otis Steel. Workmanship the most careful. Rivets Hand Driven.

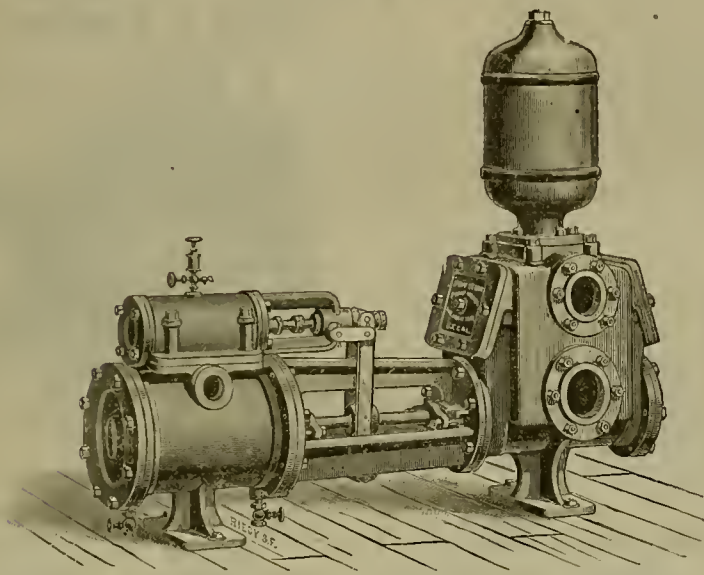
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Compound Water Works Engines and Pumping Machinery
A SPECIALTY.



THE IMPROVED DOW STEAM PUMPS

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BOILER FEEDING, FIRE PURPOSES,
MINING, HYDRAULIC WORK,
ARTESIAN WELLS,

And in fact Every Purpose for which

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ARE REQUIRED.

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(SUCCESSOR TO HAWKINS & CANTRELL).

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AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

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SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
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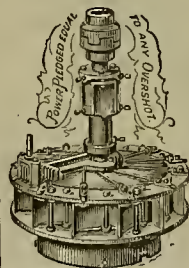
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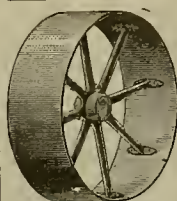
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IRRIGATING MACHINERY.

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NO ENGINES OR BELTS. NO PUMP VALVES.

PRICE OF PLANT REDUCED ONE-THIRD.

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List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.]

FOR WEEK ENDING APRIL 8, 1884.

296,503.—DREDGER—H. B. Angell, S. F.
296,503.—CARTRIDGE REPRIMER, ETC., H. T. Hazard, Los Angeles.
296,447.—HUB FOR VEHICLE WHEELS—Benj. J. Jacobs, S. F.
296,580.—ODORLESS PRIVY SEAT—F. B. Kendall, Timwater, W. T.
296,447.—THRASHER AND CLEANER—W. H. Parrish, Salem, Or.
296,709.—SEPARATING PRECIOUS METALS FROM ORES—E. H. Russell, Park City, U. T.
296,710.—SEPARATING PRECIOUS METALS FROM ORES—E. H. Russell, Park City, U. T.
296,474.—CARPET SEWING MACHINE—A. B. Smith, S. F.
296,683.—MACHINE FOR MANUFACTURING MOUTH PIECES FOR CIGARS—E. Ehlis, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

San Francisco Metal Market.

WHOLESALE.

ANTIMONY—Per pound.	14 @ 15
IRON—Glenbrook, ton.	25 50 @
Eglington, ton.	24 50 @
American White Pig, ton.	23 00 @
Oregon Pig, ton.	22 00 @
Clippert Gap, Nos. 1 to 4.	32 50 @ 33 00
Refined Bar.	33 @ 34
Horseshoes, keg.	5 50 @ 6
Nail Rod.	7 @ 7 1/2
Norway, according to thickness.	6 1/2 @ 7
ST. AL—English Cast, lb.	14 @ 15
Black Diamond, ordinary sizes.	14 @ 15
Drill.	12 @ 14
Machinery.	22 @ 24
Copper—Lug.	23 00 @
Braziers' sizes.	33 @ 34
Fire-box sheets.	1 @
Nails.	17 @ 18
Old.	2 @ 3
Bar.	8 @ 9
Cement, 100 fine.	12 @ 14
LEAD—Pig.	4 1/2 @ 4 5/8
Bar.	7 @ 7 1/2
Pipe.	8 @ 9
Sheet.	8 @ 9
hot, discount 10% on 500 bag st. Drop, 1/2 bag.	2 10 @ 2 1/2
Buck, 1/2 bag.	2 30 @ 2 40
Chilled, do.	6 00 @ 6 50
TIN PLATES—Chilled.	5 50 @ 5 75
Coke.	6 15 @ 6 25
Terne.	21 50 @ 22
Australi.	4 25 @ 4 50
I. C. Charcoal Roofing, 14x20.	19 @ 20
ZINC—By the case.	9 @ 10
Sheet, 7x3 ft. 7 to 10 lb. less the case.	3 25 @ 3 50
QUICKSILVER—By the flask.	34 @ 34 1/2
Flasks, new.	1 05 @ 1 10
Fls, old.	85 @ 1

Mining Share Market.

Some of the stock dealers think they can see signs of improvement in the market, but the signs are rather faint so far as the public can discover. In the middle mines of the Comstock they will now soon be able to do some active prospecting work. The new drifts on the 2800 level are first-class in every respect. That from the Combination west is fully eight ft wide, giving ample room for a double track, while that through the Hale and Norcross ground is seven ft wide, and will contain a double track. These broad drifts on the 2800 level constitute air galleries capable of conveying a great volume of air and thoroughly ventilating the whole level. The Hale and Norcross folks may now return and open out their ground in which they heretofore obtained such favorable prospects, and the Chollar and Potosi companies may explore their ground thoroughly in all parts; it will be remembered that even on the 2600 level they were not able to do much prospecting work. At the Sierra Nevada they have now just begun to crosscut on their 3000 level. Other crosscuts will also soon be started in the Sierra Nevada on this level, and also a west crosscut in the Union Con. In the old bonanza mines (the California and Con. Virginia) they will now soon be in a position, after several years of inactivity, to make extensive explorations in very promising ground. All the leading Gold Hill companies are now extracting sufficient ore to keep the several mills on the Carson river in full blast.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Bullion Shipments.

Horn Silver, April 9, \$12,000; Ontario, 9, \$4,318; Hanauer, 10, \$4,200; Crescent, 10, \$1,650; Horn Silver, 10, \$3,000; Ontario, 10, \$4,297; Alice, 10, \$94,726; Horn Silver, 11, \$12,000; Ontario, 11, \$4,105; Hanauer, 12, \$2,350; Horn Silver, 12, \$6,000; Ontario, 12, \$4,270. The banks of Salt Lake City report for the week ending April 9th, inclusive, the receipt of \$101,663 52 in bullion, and \$5,000 in ore; aggregate, \$106,663 52.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals of good vigor. A day at Woodward's Gardens is a day well spent.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alta S M Co.	Nevada.	29.	50.	Mar 27.	May 2.	W H Watson.	302 Montgomery st
Alpha Hydraulic M Co.	California.	5.	25.	Jan 25.	Mar 25.	P M Scott.	326 Montgomery t
Andes S M Co.	Nevada.	24.	25.	Apr 15.	May 19.	J B Burris.	309 Montgomery st
Argenta S M Co.	Nevada.	17.	10.	Apr 16.	May 20.	E M Hale.	327 Pine st
Best & Belcher M Co.	Nevada.	29.	50.	Apr 15.	May 21.	W Willis.	309 Montgomery st
Belle Isle M Co.	Nevada.	7.	20.	Mar 12.	Apr 17.	S J W Pew.	310 Pine st
Belmont M Co.	Nevada.	36.	75.	Feb 20.	Mar 31.	J W Pew.	310 Pine st
California M Co.	Nevada.	11.	20.	Mar 14.	Apr 21.	C P Gordon.	309 Montgomery st
Champion M Co.	California.	14.	07.	Mar 7.	Apr 10.	Theo Wetzel.	522 Montgomery st
Con Virginia M Co.	Nevada.	20.	20.	Mar 12.	Apr 16.	A W Havens.	309 Montgomery st
Cueva Santa M Co.	Mexico.	1.	5.	Mar 4.	Apr 7.	C E Elliott.	334 Pine st
Daisy Cement M C.	California.	1.	2.	Mar 27.	May 1.	C J Collins.	512 Montgomery st
Diana G M Co.	Nevada.	5.	10.	Mar 5.	Apr 9.	P J Flanagan.	318 Pine st
Dayton M Co.	Nevada.	11.	20.	Apr 16.	May 20.	D C Bates.	309 Montgomery st
Excelsior Water Co.	California.	6.	50.	Jan 29.	Apr 15.	H B Wheaton.	215 Sansome st
El Dorado M Co.	Nevada.	2.	08.	Mar 6.	Apr 8.	J H Masch.	326 Montgomery st
Elko Con M Co.	Nevada.	3.	15.	Mar 4.	Apr 8.	V J Sperling.	309 California st
Gould and Curry M Co.	Nevada.	47.	50.	Mar 7.	Apr 11.	A K Durbow.	309 Montgomery st
Grand Prize M Co.	Nevada.	15.	25.	Feb 29.	Apr 3.	E M Hale.	327 Pine st
Gorilla M Co.	Cal.	3.	15.	Feb 27.	Mar 31.	A A Esquist.	436 Montgomery st
Independence M Co.	Nevada.	13.	20.	Mar 12.	Apr 16.	J W Pew.	310 Pine st
Justice M Co.	Nevada.	40.	10.	Mar 3.	Apr 7.	R E Kelly.	419 California st
La Grange Ditch and M Co.	California.	8.	50.	Mar 31.	May 5.	C Halsey.	328 Montgomery st
Lady Washington M Co.	Nevada.	4.	10.	Apr 4.	May 9.	J W Watson.	302 Montgomery st
Lake County Quartz M Co.	California.	8.	123.	Mar 10.	Apr 16.	A Baird.	430 California st
Medusa M Co.	Nevada.	25.	10.	Apr 16.	May 20.	C E Elliott.	326 Montgomery st
Murchie M Co.	California.	3.	15.	Mar 31.	May 5.	W Letts Oliver.	328 Montgomery st
Morgan M Co.	California.	10.	60.	Feb 27.	Apr 7.	C L Tilden.	806 Market st
Mammoth Bar M Co.	California.	5.	15.	Mar 14.	Apr 18.	J W Pew.	310 Pine st
Mayflower Gravel M Co.	Cal.	23.	15.	Mar 3.	Apr 6.	J Morio.	331 Montgomery st
North Gould & Curry M Co.	Nevada.	6.	25.	Feb 29.	Apr 3.	H Holmes.	309 Montgomery st
Ophir M Co.	Nevada.	47.	100.	Apr 3.	May 6.	E B Holmes.	309 Montgomery st
Puget Sound Iron Co.	Washington.	7.	1.00.	Mar 12.	Apr 25.	A Halsey.	328 Montgomery st
Pedro Coro M Co.	Arizona.	1.	6.	Feb 29.	Apr 3.	J W Pew.	310 Pine st
Pleasant Valley M Co.	Cal.	3.	10.	Mar 3.	Apr 7.	J C Stadplat.	419 California st
Peoples M Co.	Arizona.	1.	25.	Apr 8.	May 17.	C E Elliott.	309 Montgomery st
Savage M Co.	Nevada.	59.	50.	Apr 5.	May 9.	G R Wells.	309 Montgomery st
Tilden M Co.	Nevada.	3.	05.	Apr 15.	May 19.	C V Hubbard.	310 Pine st
Union Con M Co.	Nevada.	26.	1.00.	Mar 6.	Apr 8.	J M Buffington.	309 California st
Utah S M Co.	Nevada.	43.	1.00.	Mar 4.	Apr 8.	R C Pratt.	309 Montgomery st
Wildman M Co.	California.	1.	25.	Feb 13.	Mar 28.	R E Llou.	310 Pine st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Morgan M Co.	Nevada.	C L Tilden.	806 Market st.	Annual.	May 3

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D C Bates.	309 Montgomery st.	25.	Apr 15
Bodie Con M Co.	California.	G W Sessions.	309 Montgomery st.	50.	Apr 5
Bulwer Con M Co.	California.	W Willis.	309 Montgomery st.	10.	Jan 23
Contention Con M Co.	California.	D C Bates.	309 Montgomery st.	10.	Jan 23
Corbett Blue Gravel M Co.	California.	T Wetzel.	522 Montgomery st.	10.	Mar 15
Idaho M Co.	California.			4.00.	Apr 2
Jackson M Co.	California.	D C Bates.	309 Montgomery st.	10.	Mar 15
Kentuck M Co.	Nevada.	J W Pew.	310 Pine st.	10.	Apr 15
Paradise Valley M Co.	California.	W Letts Oliver.	328 Montgomery st.	10.	Apr 15
Standard Con M Co.	California.	Wm Willis.	309 Montgomery st.	25.	Mar 12
Syndicate M Co.	California.	J Stadplat.	419 California st.	10.	Apr 5

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar 27.	WEEK ENDING Apr. 3.	WEEK ENDING Apr. 10.	WEEK ENDING Apr. 17.
Alpha.	1.301.45	1.551.50	1.551.50	1.551.50
Alta.	1.551.30	1.601.15	1.451.10	1.35
Andes.	25	30	25	25
Argenta.	851.10	1.301.00	1.151.05	1.10
Belmont.	2.50	2.602.45	2.602.25	2.502.20
Best & Belcher.	2.50	2.602.45	2.602.25	2.502.20
Bullion.	50	50	50	50
Bonanza King.	20	15	20	15
Bodie Con.	7.25	9.252.25	6.35.50	6.503.75
Bulwer.	05	40	30	35
Bodie Tunnel.	1.20	1.751.10	1.15	1.05
Bulwer.	05	05	05	05
California.	1.00	1.15	1.15	1.20
Challenge.	1.00	1.15	1.15	1.20
Champion.	1.20	1.451.15	1.351.10	1.251.00
Confidence.	1.00	1.15	1.15	1.20
Con. Imperial.	1.00	1.15	1.15	1.20
Con. Virginia.	1.10	1.15	1.10	1.05
Con. Pacific.	40	45	35	40
Crown Point.	1.00	1.101.20	1.01.20	1.40
Day.	2.00	2.00	1.751.35	2.00
Eureka Con.	4.10	4.304.20	4.254.05	4.10
Eureka Tunnel.	2.50	30	25	30
Excelsior.	1.30	1.501.25	1.401.15	1.301.10
Grand Prize.	1.60	2.402.50	4.752.50	3.00
Gould & Curry.	1.15	1.351.10	1.201.00	1.15
Goodshaw.	30	45	25	05
Hale & Norcross.	1.30	1.501.25	1.401.15	1.301.10
Holmes.	1.60	2.402.50	4.752.50	3.00
Independence.	1.00	1.15	1.10	1.05
Julia.	15	15	15	20
Justice.	15	15	15	20
Martin White.	65	55	60	55
Mono.	1.70	2.101.55	1.35	1.701.10
Mexico.	1.30	1.701.45	1.601.20	1.30
Mt. Diablo.	2.00	2.30	2.40	2.00
Northern Belle.	2.65	2.902.55	2.302.50	2.702.35
North Belle Isle.	15	15	10	105
Occidental.	1.50	1.651.00	1.60	1.55
Ophir.	1.50	1.651.00	1.60	1.55
Overman.	30	30	25	20
Potosi.	70	90	75	55
Final Con.	80	90	65	80
Savage.	80	90	65	80
Seg. Belcher.	2.35	2.802.00	2.551.85	2.351.85
Sierra Nevada.	2.35	2.802.00	2.551.85	2.351.85
Silver Hill.	05	05	05	05
Silver King.	30	30	30	30
Scorpion.	30	30	30	30
Syndicate.	80	55	75	60
Tioga.	15	10	10	15
Union Con.	1.50	1.701.35	1.651.30	2.252.00
Utah.	1.20	1.30	1.40	1.20
Yellow Jacket.	1.90	2.001.85	2.401.95	2.151.70

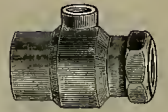
Sales at San Francisco Stock Exchange

THURSDAY A. M., Apr. 17.	AFTERNOON SESSION.
180 Alta.	1.20
300 Andes.	300
1210 Bodie Con.	3.80
200 B. & Belcher.	1.30
300 Bulwer.	900
350 Benton.	300
200 Belmont.	1.10
250 Crown Point.	550
100 Chollar.	1.10
50 Con. Virginia.	200
100 Challenge.	250
150 Con. Pacific.	350
50 Grand Prize.	1.25
100 Goodshaw.	200
150 Mono.	1.15
40 Navaio.	2.50
700 Ophir.	600
150 Sierra Nevada.	200
1200 Savage.	400
150 Union Con.	2.10
200 Yellow Jacket.	1.70

"Clean in Every Respect," Etc.

The Mining and Scientific Press, San Francisco, Dewey & Co., publishers. This is one of the best weeklies in the United States. It contains the usual mining news, a large amount of valuable reading, including frequent articles on the topography, geology, archaeology and natural history of California and the adjoining Territories. Its position is always in favor of good morals, and in fact the paper can be pronounced clean in every respect.—*American Antiquarian.*

JET PUMPS.



THE CHEAPEST AND BEST
STEAM PUMP for Lifts from 10 to 70 ft.
FOR IRRIGATING PURPOSES

And all General Work where a Simple Durable Pump is Required.

NO VALVES! NO PISTON!
NO OIL REQUIRED!

Can be Run by a Child.

EACH PUMP GUARANTEED.

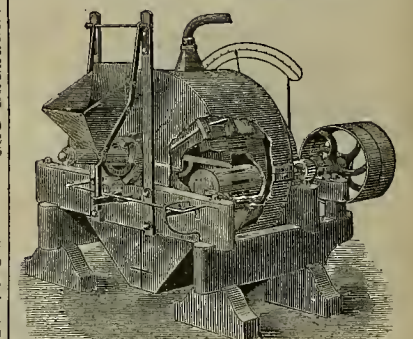
PRICE—One-tenth of an ordinary Steam Pump, same capacity.

Call and See One in Actual Operation.

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18 and 20 Fremont Street, San Francisco

Tustin's Pulverizer



WORKS ORE WET OR DRY.

Awarded SILVER MEDALS in 1882 and 1883
By Mechanics' Institute.

MANUFACTURED AT

The Tustin Windmill Horse-power and

Pumping Machine Works.

308 Mission Street, S. F., Cal.

By W. I. TUSTIN, Inventor and Patentee.

Send for Circular.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That is this understood and appreciated is evidenced by the number of patents issued through their SCIENTIFIC PRESS PATENT AGENCY (S. F.) from week to week and year to year.

A GOLDEN OPPORTUNITY!

EQUAL PARTNER WANTED.

For the State of California, to furnish means

...TO WORK THERE...

Best Amalgamator and Separator

Yet Invented. Patented Oct. 16, 1883.

Will work any material profitably it will pay to dig—Black Sand and Pulverized Free-milling Ore. Little water required; simple in construction; saves all the gold, loses no quicksilver, and requires but a small expenditure of money for immense returns. Investigate, and address the inventor,

GEORGE DEAN,

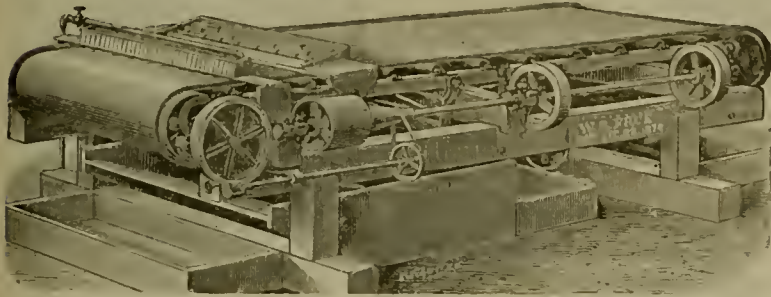
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PACIFIC POWER CO.

Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 814 California street.

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\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

PRICE REDUCED,

Jan. 1, 1884, to FIVE HUNDRED
and SEVENTY-FIVE DOLLARS
(\$575.00).

OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal.
A machine can be seen in working order and ready to make tests at the office of Hunkley, Spiers & Hayes, No. 220 Fremont Street, San Francisco.

To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

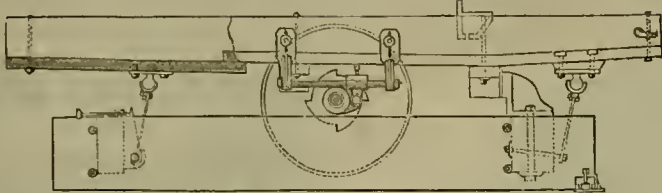
That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,
January 3, 1884.

SAN FRANCISCO, CAL.

PATTEN'S CONCENTRATOR AND AMALGAMATOR COMBINED.

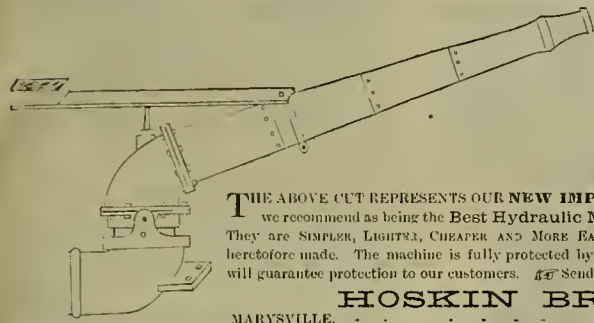


This machine requires less power, less care or attention, and is less liable to get out of repair than any concentrator now in use. All of which any practical miner will comprehend when seeing it in operation.

The wear and tear is nominal, and the construction so simple that any miner can put it up and run it; and the low price brings it within the reach of all mill men, as it will save enough to pay for itself in any mill in a very short time. One machine will concentrate the tailings from a five-stamp battery.

The undersigned is now located at the Etna Iron Works, 217 to 221 Fremont street, where he is building the above machines and prepared to fill orders, and guarantee them to do all that is claimed. Estimates given and orders promptly filled for all kinds of mining machinery.

C. W. PATTEN, 217 Fremont Street, S. F.



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MINERS:**

THE ABOVE CUT REPRESENTS OUR NEW IMPROVED GIANT, WHICH we recommend as being the Best Hydraulic Machine ever manufactured. They are SIMPLER, LIGHTER, CHEAPER AND MORE EASILY WORKED than any style heretofore made. The machine is fully protected by patents owned by us, and we will guarantee protection to our customers. Send for Circular and Price List.

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JENKINS PATENT VALVES.

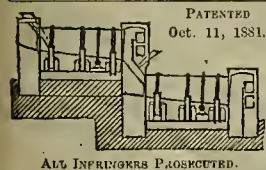
Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over all other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

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PATENTED
Oct. 11, 1881.

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Working up to 93 per cent. of Fire Assay, using 25 per cent. salt since July, 1882. **ALL LICENSES FOR USE FOR SALE, OR FURNACES CONSTRUCTED. Address R. A. NEVIN, Patentee, Etna Iron Works, 217 Fremont St., San Francisco, Cal.**

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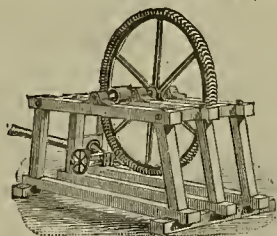
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For Mills, Pumping and Hoisting

OVER 300 IN USE!

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SEND FOR CIRCULAR.

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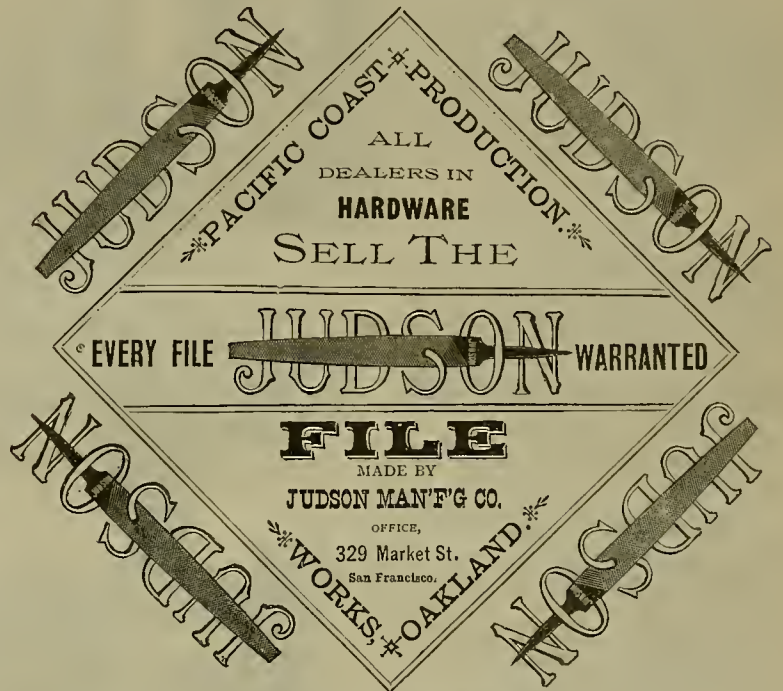
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And Warranted Perfectly Safe.

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THE SAFEST AND BEST EXPLOSIVE IN THE WORLD!

H. D. VAN CAMPEN, the patentee, has been at work for many years to accomplish the work of inventing an explosive that would compete with nitro-glycerine and yet be safe to handle. He has finished his undertaking, and to-day has upon the market the safest and best explosive in the United States. We defy any explosive on trial to make us take back the above statement. Any person taking exceptions to our statements we will meet on trial, IN ANY KIND OF BLASTING.

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Nothing can Compete with the Van Campen Compound.

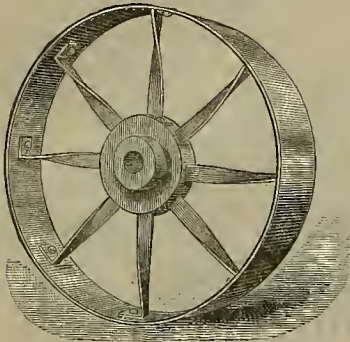
It may be cut in pieces, stamped on the ground, jammed around, set on fire and burned up, and no explosion. **REMEMBER ITS SAFETY.** We will leave the buyer to be the judge, and by testing will prove all we claim. For Sale in car-load lots direct to the trade. **PRICES LOW AND GOODS WARRANTED.** Anyone wishing Compound, or further instructions, should correspond with

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Iron and Machine Works.

MACBETH'S —PATENT— STEEL PULLEY.



Advantages of these Pulleys.

They are less than half the weight of cast-iron pulleys; are polished on the face; are made either crowned or straight, and are turned in the lathe the same as the best make of cast-iron pulleys. They are carefully balanced. They are subject to no contraction strains, and can be run at very high speed without danger of bursting. On account of their great lightness and the form of the arms, they absorb less power than any other pulley. They are the only pulley of the kind which runs true. They cannot be broken in transport.

TESTIMONIAL:-

MATHER LANE SPINNING Co. (Limited),
LEIGH, ENGLAND, Nov. 5, 1883.

N. Macbeth, Esq.—Dear Sir: The Patent Steel Pulleys supplied throughout to our No. 2 Mill are working to our entire satisfaction.

They are very true, and are about 50 per cent lighter than the cast-iron pulleys in our No. 1 mill.

Yours faithfully,

For the Mather Lane Spinning Co. (Limited),
(Signed) RICHARD T. MARSH,
Managing Director.

Risdon Iron & Locomotive Works,

Sole Manufacturers and Agents for the
Pacific Coast,

S. E. Cor. Beale & Howard Sts., San Francisco.
Send for Circular and Prices.

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MANUFACTURERS OF

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Kinds of Machinery for Mining Purposes.

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Manufacture Iron Castings and Machinery
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All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
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F. P. BACON, PRESIDENT

C. L. FOUTS, SECRETARY

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Dyer Cannon Ball Quartz Mill, 222 & 224 Fremont Street, San Francisco, Cal

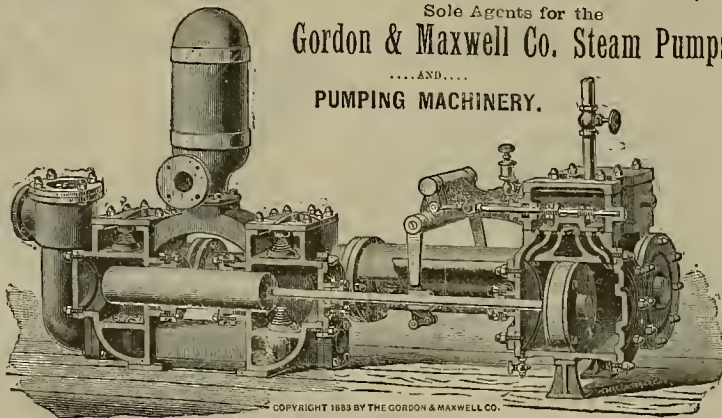
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Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

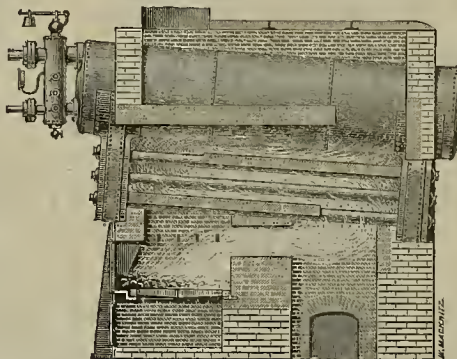
TESTIMONIALS.

St. Louis, Mo., Sept. 23, 1883

Messrs. Adolphus Meier & Co., GENTLEMEN: We cheerfully certify that the "Heine Patent Safety Boiler" put up by you in our establishment has proved very satisfactory in its working. The chief points of excellence in the "Heine Safety Boiler" are its economy in fuel and space, freedom from scaling, aptitude for power and heating purposes, working equally well with clear and muddy water. We warmly recommend it to all using steam machinery. Yours truly,
ANHEUSER-BUSCH BREWING ASSN.

OFFICE OF Supt of ROYAL RAILWAYS,
BERLIN, Sept. 23, 1883.

To Mr. H. Heine, Civil Engineer: In reply to your inquiry of September 24, we respectfully inform you that the three boilers built under your patents, under steam since September 25, 1881, at the Alexander Place Depot, as well as the two at Friedrich Strasse Depot, under steam since September 22, 1882, have given good satisfaction, requiring no repairs whatsoever to date. The internal cleaning of the boiler was always accomplished



with ease on account of the convenient arrangement of the tube caps, the adhesion of scales being fully prevented thereby, and the boilers kept in prime condition.

(Signed): BRAUCKE.

Send for Circular and Prices.

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Orders for Mining and Scientific Books in general will be supplied through this office at published rates.

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258 Market St., N. E. cor. Front, up-stairs, S. F. Experimental machinery and all kind of models, tin, copper and brass work

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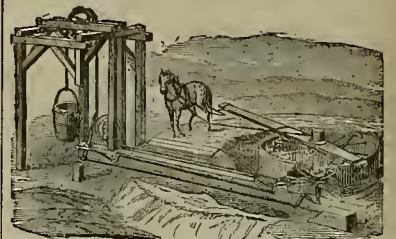
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Plants for Gold and Silver Mills, embracing the latest and most improved machinery and processes for base and free ores. Water Jacket Smelting Furnaces for silver, lead and copper ores, with new and important improvements, superior to any other make. Hoisting Works, Pumping Machinery, Chloridizing Furnaces, etc. We offer our customers the best results of thirty years' experience in this special line of work, and are prepared to furnish the most approved character of Mining and Reduction Machinery, superior in design and construction to that of any other make, at the lowest possible prices. We also contract to deliver, in complete running order, Mills, Furnaces, Hoisting Works, etc., in any of the Mining States and Territories. Estimates given on application. Send for illustrated Circular.

MINERS' HORSE WHIM.



ONE HORSE CAN EASILY HOIST OVER 1,000 LBS. at a depth of 500 feet. The Whim is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of the whim is bolted to bed-timbers, thus avoiding all frame-work. When required, these whims are made in sections to pack on mules.

120 in Actual Use.

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—AT—

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—FOR—

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

—FOR—

Best Hoisting Engine and

Boiler Combined.

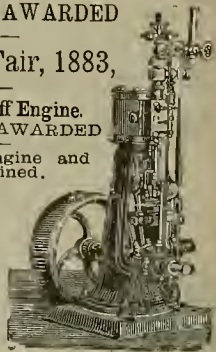
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Engine Works,

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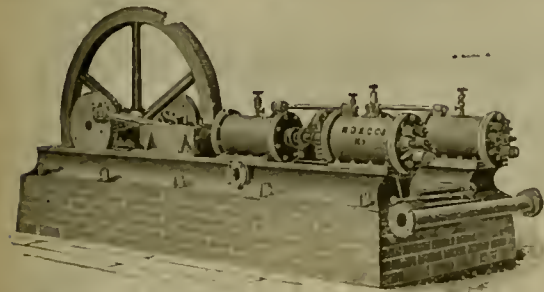
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THE LATEST IMPROVED NATIONAL DRILL,
— WHICH —

Anyone, upon examining, will proclaim to be far superior to anything yet offered to the MINING PUBLIC in the shape of a ROCK DRILL.

CALL AND SEE IT OR SEND FOR CIRCULARS.



F. A. HUNTINGTON, SAW, SHINGLE, AND QUARTZ MILL MACHINERY.

We Call Attention to the Following Testimonials as to the Capacity and Durability of the Centrifugal Roller Quartz Mill:

SAN FRANCISCO, Dec. 27, 1883.

Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR—The four-foot Centrifugal Roller Mill, bought of you in August, 1882, for the Whidden Gold Mining Company, of Shingle Springs, has given entire satisfaction, both on our own and on custom work, saving from 85 to 90 per cent of the gold in the mill. In conclusion I will say that we are so well pleased with it that Mr. Whidden and myself are putting one of the same size on the Tohongo gold mine, near Ravenna, in Los Angeles county.

Yours truly, P. VEASEY,
34 California St., S. F.

FINE GOLD GULCH, Nov. 10, 1883.

Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR—In reply to your inquiry concerning the working of your Centrifugal Roller Quartz Mill, I am pleased to say that I run one of them for seven months, doing custom work on different varieties of rock, and that the mill gave satisfaction in every respect, and did all that you claim for it.

Yours truly, BYRON JENNINGS.

GARIBALDI MINE, Dec. 17, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—In reply to yours of the 10th inst., I take pleasure in assuring you that your Centrifugal Roller Quartz Mill gives entire satisfaction, and I can heartily recommend it to mining men who want a cheap and efficient crusher.

Yours truly, E. I. PARSONS, Supt.

32 WASHINGTON AVENUE, S. F.

SAN FRANCISCO, Dec. 29, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR: Having run one of your Centrifugal Roller Quartz Mills on sample lots of rock from more than twenty different mines, I must say that in every instance it has given the best of satisfaction in every particular; and I recognize its superiority over any other mill manufactured.

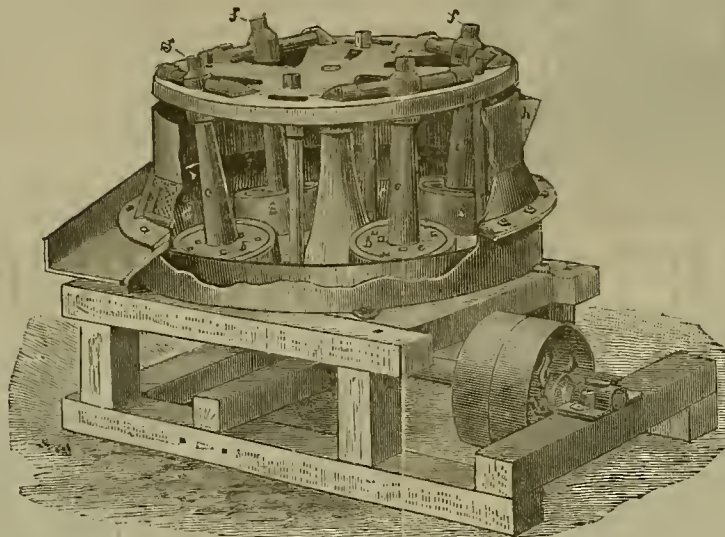
Very truly yours, D. O. MOWEY.

MILLS ERECTED WITH ALL APPLIANCES COMPLETE.

F. A. HUNTINGTON, 45 Fremont St., San Francisco.

SEE SAMPLE LOTS OF ORE WORKED.

SEE WHERE A MACHINE CAN BE SEEN IN OPERATION.



CENTRIFUGAL ROLLER QUARTZ MILL.

The work done by the Centrifugal Roller Quartz Mill, during the past two years, on various mines and different kinds of rock, PROVES ALL THAT IS CLAIMED FOR IT, VIZ:

1. The cost of same capacity is not more than one-half that of stamps.
2. Freight to mine one-fourth that of stamps.
3. Cost of erection at mine one-tenth that of stamps.
4. It runs with one-third the power per ton of ore crushed.
5. The wear is less than that of stamps.
6. The wearing parts are easily duplicated.
7. It has a much better discharge, and leaves the pulp in better condition for concentrating.
8. It is a better Amalgamator, saving fully nine-tenths of the gold in the mill; the balance can be saved on plates in the usual manner.
9. It is continually crushing; not like the stamp, using power to suspend it in air ninety-nine one-hundredths of the time and the balance making a thundering noise, and accomplishing comparatively small results. It is as far in advance of the stamp mill as the present method of making flour with improved rolls is over the Indian's mode of crushing corn in a stone mortar.

PATTEN'S CONCENTRATOR.

This machine requires less power, less care or attention, and is less liable to get out of repair than any concentrator now in use; all of which any practical miner will comprehend when seeing it in operation.

SUNORA, CAL., Dec. 1, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR:—In reply to yours of recent date, inquiring about the Centrifugal Mill which I bought of you, I will say that I have run the mill four months on hard rock; and I take pleasure in adding that the mill has in every way given the best of satisfaction.

Yours truly, J. H. NEALE.

GARIBALDI MINE,
Calaveras Co., Cal., Dec. 17, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR:—In answer to your inquiry concerning the working of the five feet Centrifugal Mill, bought of you for the Garibaldi mine in Calaveras county, I take pleasure in saying it gives entire satisfaction in every respect, and I only regret that the mine does not warrant the purchase of more of them and the continued use of the one now in operation.

Very truly yours, O. B. SMITH.

F. A. Huntington Esq., San Francisco, Cal.—
DEAR SIR—Your Centrifugal Roller Quartz Mill has run on the Whidden Gold Mining Co. property at Shingle Springs, El Dorado Co., Cal., about four months, and it has done good and satisfactory work, a greater proportion of gold remaining in the mill than in the stamp battery.

FRED JONES, Supt.

HILBRETH RANCH, Fresno Co., Cal.,
January 11, 1884.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR:—In regard to your mill (Centrifugal Roller), I have crushed about 500 tons of rock in the mill, and am glad to say that it has given entire satisfaction, and can recommend it to the public as the most expeditious and least expensive method for crushing and milling ore that I have ever seen.

Truly yours,

THOS. HILBRETH.

CAPACITY AND DURABILITY GUARANTEED.

PACIFIC MACHINERY DEPOT.

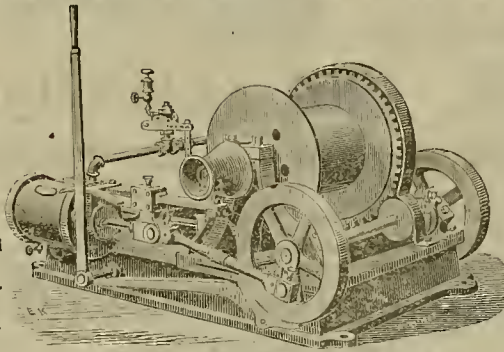
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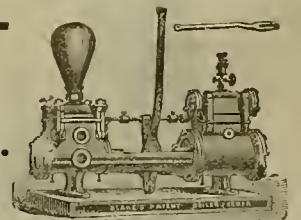
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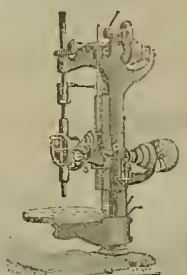
Hoisting Engines of all Kinds.

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More than 16,000 in Use.



The Korting's Injector is the simplest, cheapest and best in use. Will draft its own water, hot or cold, and feed under varying pressure. Send for Circular.



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Medal Awarded, Mechanics' Fair, 1882.

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IRON CASTINGS OF ALL DESCRIPTIONS.

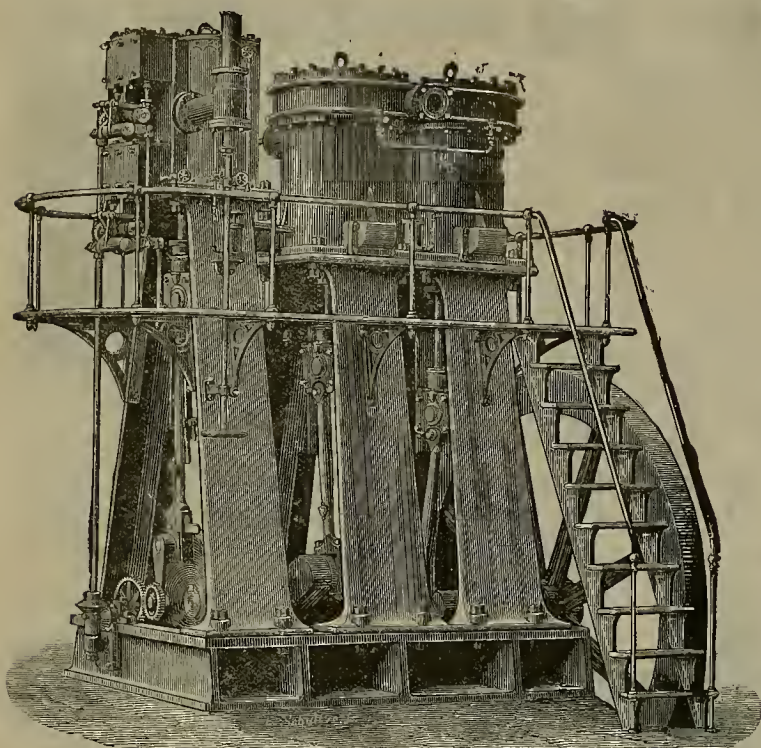
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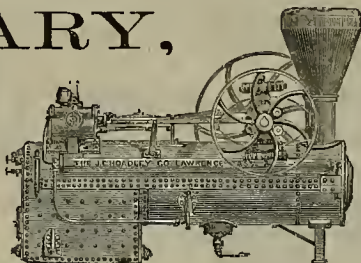
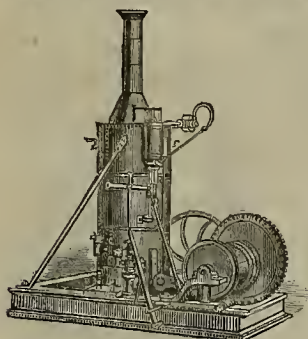
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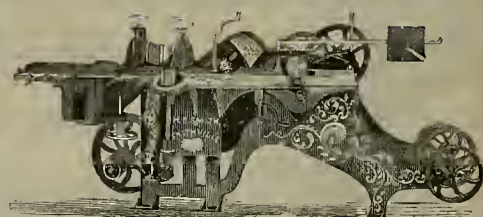
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On Rock Drills.

[Written for the Press by GEO. J. SPECHT, C. E., 418
California St., San Francisco.]

The History of Rock Drills.

A short time after Martin Weizel of Freiberg, in 1613, had introduced the system of boring and blasting rock by means of powder, Henry Huthmann of Stefeld in the Hartz advanced, in 1683, the idea of a drilling machine, after the principle of a ram. But no practical result came from this, as was also the case with the propositions of Gainschnigg, of Salzburg, in 1803, and those of Richard Trevithick, of Cornwall, in 1813. In 1844, the Englishman, Brunton, proposed to use compressed air to work a hammer, striking a drill at the rate of 260 blows a minute, stating that the compressed air escaping from the drills would also ventilate the mine. But he did not succeed very well. In 1851, Mr. Cave of Paris, took up Brunton's idea and constructed a drilling machine worked by compressed air. The then proposed construction of the Mont Cenis tunnel gave a lively stimulus to inventors in this line. Bartlett of England in 1854, Colladou of Switzerland, in June, 1855, and Schuhmann of Germany, also in 1855, finally carried the idea to work drilling machines by compressed air to success. They were soon followed by Castelain, Schwarzkopf (1857), Sommeiller, Crattoni, and Grandis, and Haupt (1858), who tried his invention at the Hoosac tunnel. From then until now a very large number of inventions referring to rock drills have been patented all over the world. In the United States not less than 243 patents having been granted. With a few exceptions—notably the diamond drill—all these machines are so-called percussion drills.

Machine Drills in the United States.

In the United States the first power drill was a hand drill, invented by John Singer, and used for a period of four years, from 1838 to 1842, in the construction of the Michigan and Illinois canal; it was also used in the enlargement of the Erie canal, and in the cut through Mount Washington (Western railroad of Massachusetts.) The next important invention was the steam drill of J. Couch and Joseph W. Fowle, Boston, patented in 1848. They, however, did not meet with great success. From that time to 1861, when machine drills were used at the Mont Cenis tunnel, the inventors neglected this kind of machines. But the favorable result obtained in that tunnel caused the contractors of the Hoosac tunnel to investigate the question more thoroughly. They found the Sommeiller machine, used at the Mont Cenis not well adapted to their work, therefore bought the Fowle & Couch patent and engaged several

engineers to construct a machine suitable for their work. The result was the invention of a large number of machines. The first one tried was that of Hanson, which used the principle of the Couch drill, but did not meet with success, as it was too complicated.

First Burleigh Drill.

The only invention which proved to be of practical value was that of Brooks, Burleigh & Gates. Ten of these drills were used in sinking the central shaft and 30 in the headers. But the repairs were too many, so, for instance, for several months each and every machine had to be repaired once each day. The official re-

ports of the cylinder, the striking of the piston against the cylinder head being prevented by rubber rings or similar devices.

No Principal Differences in the Various Percussion Drills.

There is no characteristic difference in the principle of the various percussion drills, and in spite of the many improvements in the details, the more solid and exact construction and the simplification and the reduction of the number of parts, none of the various percussion drills have been able to drive its competitors out of the field.

The different systems, therefore, depend for

sary than if a quiet pressure be used instead. He proves the truth of this by an account of a number of experiments, which show the proportion between the effect of pressure and blow to be in an average—1 to 7.] Compressed air as a motive power is very expensive, in reference to the plant necessary to create it as well as to the running expenses. These three points, the many repairs necessary, the small useful effect and the expense of compressed air as a motive power, are disadvantages, which are natural with the percussive system and cannot be avoided by whatever ingenious inventions and improvements. They are the natural weaknesses of the system. The percussive system is in fact only an imitation of the human hand drilling. The system of the future has to abandon this path and must be based upon more correct principles. This has been done by Alfred Brandt in his hydraulic rock drill, an engraving of which is given on this page. This invention marks a new epoch in the history of rock drills.

The Various Motive Powers Used.

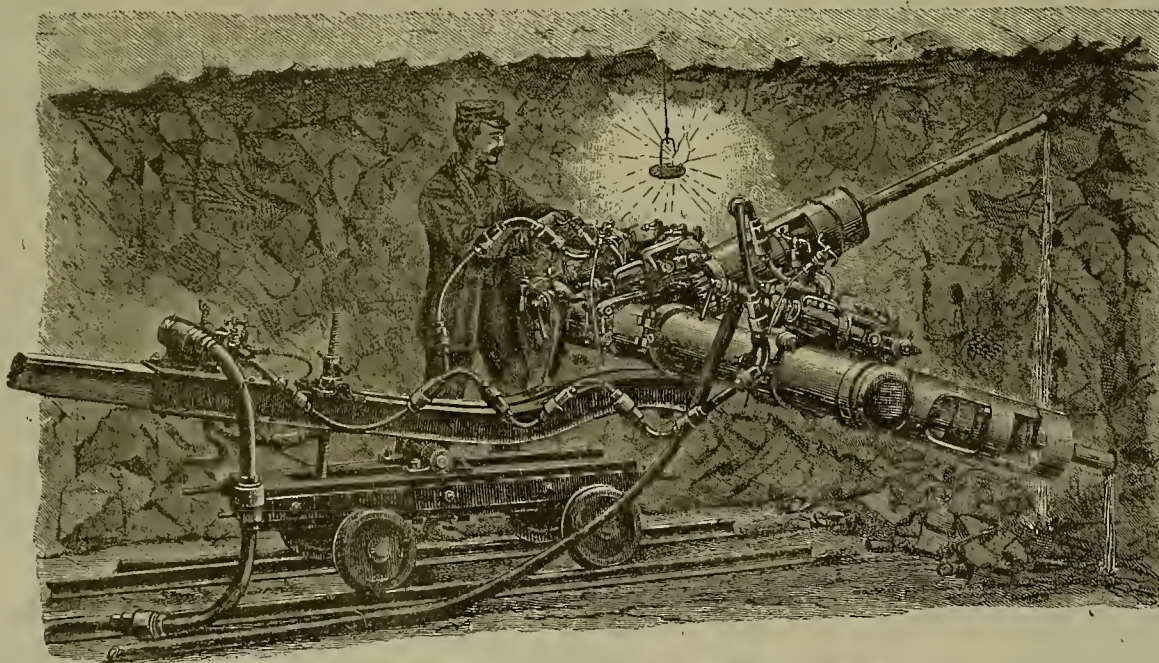
The application of steam directly to rock drills is only practicable in open cuts, quarries, short tunnels and shallow shafts, but not in more extensive underground workings. It, therefore, is rarely used, and does not need to be considered here.

Compressed air is at present the most generally used motive power. The principal advantages claimed for the same are that it affords a good ventilation of the underground workings by the escape of air from the drills, and that its use all through the mine or tunnel is exceedingly handy.

The last claim is undoubtedly true, especially when compared with the direct use of steam. But it is different with the first one. The air escaping from the drills assists the ventilation only while the drilling is going on, but not then, when fresh air is most needed, i. e., after blasting. And even during the drilling the escape of compressed air is by no means sufficient to supply all the needed ventilation. An extra supply of fresh air has to be provided for, which is either done by opening the main air pipe after the drilling has been finished, or by a separate ventilation. The first being an exceedingly expensive and inefficient way, will hardly ever be employed, while the second is generally used, because necessity dictates it. The percussion drills have this in common with any other system of drilling. The useful effect of an air compressor is not more than from 27 to 37 per cent. Therefore, to obtain better and more economical results, it is necessary to find another power.

High tension, the pressure varying from 350 to 700 lbs., is used in his rock drills water under

(CONTINUED ON PAGE 289.)



THE BRANDT HYDRAULIC ROCK DRILL AS SEEN IN OPERATION.

port about the progress of the tunnel says that since the introduction of machine drilling the road leading to the tunnel was crowded by a continuous line of laborers, each of them carrying a piece of the drill to or from the repair shop. After a few more months machine drilling was abandoned, until in 1866 the then greatly improved Burleigh drill, almost identical to the present construction, was introduced. They worked on an average 5 days without requiring any repairs, although some remained good for several weeks. From that time on to today a very large number of inventors have patented drills or parts of drills. The principle of all these machines (except the diamond drill) is the same, namely, percussion. All have a massive piston of steel, which throws the drill bit, directly connected with it, against the rock and withdraws it again; all have a more or less simple valve motion to distribute the steam or compressed air. The setting of the drill bit is done by letting the entire piston slide back on a rifle bar; the feed is either automatic or by hand. A review of the American rock drills shows the endeavor to construct a machine as simple and as durable as possible, to lay all movable parts, such as the valve motion, the setting and feeding mechanism, inside of the cylinder or shell, so that they cannot be injured by falling rocks or other accidents, and to decrease the clearance space by shortening

their sale mostly upon the ability of their agents to present their claimed advantages to the public. But none of these can attain such a superiority that the purchaser would select it as the best under all conditions. None of the great tunnels and mines, where nearly each and every kind of percussion drills has been used and experimented with, have been able to award the prize of undisputed superiority to any one, which was claimed by all of them. The principal reasons for this are: The large number of repairs and consequently the many machines to be kept in reserve, which make the first cost of the plant too large to be practical in enterprises where time is only secondary in importance to economy. [At the Mont Cenis, one machine made only 30 feet of holes and then had to be repaired; at the Gotthard tunnel from 58 to 97 machines required repair monthly; at the Arlberg tunnel 330 feet of holes were made before a machine had to be repaired. At the Sutro tunnel it cost per month \$257.60 for repairs to keep 4 drills at work.] The useful effect of the motive power, which works upon the drill by a blow, thereby pulverizing it, is only very small, (not more than 20-23 per cent.) [An interesting article translated from the German and republished in Van Nostrand's magazine of September, 1877, page 268-274, Prof. Vick says: "If we use blows for shaping or dividing substances, a greater expenditure or waste of labor is neces-

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Milling Gold Ores.

EDITORS PRESS:—In your annual number there was a letter from Mr. Drake, of the Patterson mine in Tuolumne county, in regard to the loss of gold by wet crushing and amalgamating on copper plates. He quotes numerous authorities to prove that the loss is all the way from thirty to sixty per cent. of the gold in the ore. Now, while there is undoubtedly great room for improvement in the working of gold ores, and the discussion of this question by practical mill men is of the greatest importance, still let us start fair and not from any false base of operations. In my opinion, and it is also the opinion of many practical amalgamators, with whom I have discussed the question, the loss of free gold is greatly exaggerated by so-called experts, and by collectors of statistics in relation to gold workings. The distinction between the free gold contained in the ore and that intimately combined with the sulphurets, whether chemically or mechanically, is not distinctly made in many instances. The sulphurets can be saved by means of shaking tables, as Mr. Drake acknowledges. Now, in most of the statistics from which he quotes, I believe, no account has been taken of the sulphurets in the absence of cheap methods for working and saving them; but the difference between the gold found in the ore by fire assay, and that obtained by mill process has been charged to the account of gold floating off "down stream."

This is manifestly unjust to the mill process by amalgamation on plates; and when to this is added the gold, unnecessarily lost by incompetent amalgamators and mill men, and by experiments of tyros, who, with no practical experience, attempt to revolutionize gold saving, another large item is added to the account. When Mr. Drake quotes "Fossett's Colorado," I can assure him that if many of the facts were gathered from such examples, as for instance, Judge, now Senator, Bowen's mill and mine in San Juan, where with seventeen inches drop, coarse screens and low speed, probably half his gold went down the gulch, a big percentage can be taken from the figures obtained in summing up. This last instance is, probably, but one of many. When Judge Bowen was told, on the spot, by an Amador county amalgamator, that he was losing gold unnecessarily, he replied: "I know it, but I am making \$700 a day, and that is good enough for me." Can there be a doubt, but that all that gold, thrown away, was charged to the account of the "defective mill process?" Again mining men, for obvious reasons, are inclined to exaggerate the value of ore; not from any inclination to deceive any one, but from the natural disposition all people have, of putting "their best foot forward," where their interests are at stake. What is more natural or easier to charge the deficiency in results to that same "mill process," and to say that the gold has floated off down stream. No such loss of gold as is claimed by Mr. Drake, under the authority of the various Professors mentioned in his letter, is acknowledged to take place by the best practical amalgamators and mill men, with whom I have spoken. Probably, on account of pride in their profession, they have bias on the other side, still they hold their work open to investigation, and I believe that despite the statistics, at least a "Scotch verdict" of "not proven," should be entered up against them. The temptation to continue writing on this subject and others allied to it, as well as on some other points raised by Mr. Drake, is enticing; but it is some time since his letter was published, and the ground may have been covered by others much more competent than myself. His letter was of great interest to me, and, I believe with him, that open discussion of these questions, by men engaged practically in milling, is the surest method of advancement.

W. S. DUVAL, M. E.
Angels, Calaveras Co. Cal.

SALT LAKE BUYING IDAHO ORES.—The Wood River Times says: The Times is informed, on reliable authority, that the Germania Company, whose works are located about six miles south of Salt Lake City, will soon enter the field on Wood River, with the determination to buy all kinds, grades and qualities of ores offered for sale. This will secure another outlet and market for our ores scarcely second to Omaha. The Germania Company is a joint stock concern, which is owned by Western men exclusively. Its plant, which is almost new and of the most superior workmanship, includes a sampling mill, three smelting furnaces, a refinery and a white lead, paint, sheet lead and lead pipe manufactory. This plant must have cost all of \$300,000. Besides this, the value of its ore, bullion, and other products on hand and in transit aggregates from \$700,000 to \$1,000,000, and its credit is A 1. It is therefore as powerful a combination as could be desired here. The Germania works have been in operation for some years, but it is only recently that the profits of the institution have been sufficiently encouraging to justify it in engaging in active competition with the smelting world. During the past year it purchased a

notable quantity of Wood River ores, and it has done so well on these that the management have determined no longer to restrict their purchases to our lower grade, light lead ores, but to buy all the ores offered. It is evident that the Germania Company have a special rate from the railway company; as at regular rates, to-wit: three and one-half cents to Ogden, they could not buy our ores at all. But whether they have or have not a special rate is immaterial to us. All that really concerns us is the fact that Salt Lake (or at least the Germania works) can still buy our ores, and will do so. Unless we are much mistaken, this announcement will have the effect of slightly improving the prices paid for our ores heretofore. But time will tell, as to this.

Manufacture of Soda from Sea Salt.

The municipality of Issoudun, having resolved to erect a monument to Nicholas Leblanc, the pioneer in the artificial soda industry, M. Dumas gave an eloquent address to the French Academy upon the importance and vicissitudes of that branch of manufacture. A hundred years ago the French government consulted the Academy as to the best means of replacing the soda supply, for which they had been dependent upon Spain, and a prize of 12,000 francs was offered to the inventor of a successful process for extracting the alkali from sea salt. When Leblanc had fulfilled the conditions of the prize the Academy had ceased to exist. The inventor was obliged to renounce his rights, to close his factory and to live in the extreme of poverty, until finally he committed suicide. Many persons would be surprised at the information that the two greatest economical novelties of the century are the steam engine and artificial soda; the two most fertile inventors, Watt and Leblanc. While the engines created by the former act with a great noise in all our factories, carry the trains of travelers and merchandise over the iron roads with which the continents are furrowed, or guide ships of commerce and war over the waves of the sea, the soda products penetrate into all our workshops and dwellings, as indispensable elements or auxiliary agents of labor, and as direct or indirect objects of consumption. If we were asked which of the two inventors, Watt or Leblanc, has most greatly increased the welfare of our race, we might hesitate for an answer. All the ameliorations in the mechanic arts spring, it is true, from the use of the steam engine; but all of the benefits which pertain to the chemical industries have found their point of departure in the extraction of soda from sea salt. The first result of the soda factories placed at the disposal of the soap makers, the glass manufacturers, the bleachers and the paper makers, the alkali of which they have need, and also offered to all industries sulphuric and chlorhydric acid, in unlimited quantities and at prices fabulously reduced. The second result was the introduction of chloride of lime for the rapid bleaching of vegetable tissues, in place of the slow action of solar light and damp air upon pieces of linen spread upon the grass. The four agents—a powerful alkali, two energetic acids, a bleaching powder which nothing has supplanted—gave an unprecedented range to chemical industries, and raised the question whether it was wise to leave the fabrics dependent upon the sulphur of Sicily, which might, at any moment, be enormously advanced in price; and iron pyrites, which had previously been almost worthless, was largely employed in the manufacture of sulphuric acid. The growth and competition of large soda factories reduced the price until it became necessary to look for new sources of profit, which were found, for awhile, in the manufacture and sale of chloride of lime. The leaching of the crude soda to extract the carbonate left residues, which contained all the sulphur of the sulphuric acid united to the lime. This refuse incommenced the whole neighborhood, infecting the water courses and the shores of the sea itself. These annoyances were removed by the invention of a process for regenerating the soda which was left from the leachings. The manufacture of chlorine and chloride of lime consumed peroxide of manganese, and produced chloride of manganese in great quantities. The peroxide is a natural product of limited supply; to increase its consumption is to raise its price. The chloride destroys vegetation and infects the streams; a considerable daily production of it creates a thousand difficulties. They have been obviated by a process for regenerating the peroxide, and thus getting rid of the chloride. Meanwhile, the competition continuing, and the price of soda steadily falling in proportion as the cost of manufacture diminished, help was sought—not in new economies, but in the treatment of ores capable of furnishing remunerative merchantable products. Hence the iron pyrites were replaced by copper pyrites which were accompanied by precious metals, and the profit was sought in the silver or gold which could be extracted from their cinders. This strife is now to be renewed with a rival process founded upon the decomposition of salt by ammonia, in presence of an excess of carbonic acid. Whatever may be the result of the contest, it is fortunate that modern chemistry has had the various practical schools of industry which have resulted from Leblanc's process, and which have exercised an incalculable influence upon all civilized countries.

The Mother Lode at Cœur d'Alene.

The mother lode is about two miles above Murrayville, in the bed of Pritchard creek. Messrs. Lewis, Harris & King, who own a two-thirds interest in the claim, uncovered the finest of the quartz for our inspection one day last week. The ledge is about four feet high, and is from three to seven feet wide. It has only been traced a few yards, and apparently plunges into the mountains on either side of the creek. It shelves downward as it enters the mountain. A table of rock, perhaps six or eight feet square, is literally spotted with large blotches of free gold. It is the prettiest sight we ever laid eyes upon, and a slab from the face of the quartz would command a fabulous sum for a shop-window or cabinet. Mr. Harris first discovered the rock containing free gold. He was prospecting for placers, and accidentally came upon it in the bed of the stream. Nothing is known of the extent of the quartz. The discovery was made October 19th, and the snow came in then to interfere with the running of the lines when the location was being made. The owners have never touched the claim, and will not allow any one else to interfere with it. The quartz, filled with gold, lies exactly to-day as it did when first found. The discoverers own a fractional placer claim, including the ledge, and have taken out ten dollars to the pan in the creek below. They offer to sell for \$30,000, but will take no less sum, and will not listen to any offers for bonding. If the quartz is detached, or only a pocket, they will still realize a snug little sum from the gold that is in sight. All the quartz in the ledge assays well, even that which shows no trace of free gold assaying as high as \$227.38 in gold and \$32.32 in silver. We saw the returns from this assay, which were the lowest ever made. If the sale is not effected within a short time, the owners will begin work. They are elderly men, old miners, and feel as if this was to be their last stake. They have lived in a cabin in sight of their treasure, throughout the long, dreary winter. Loose slate rock is scattered over the quartz, and a thousand men might visit the spot without discovering the rich quartz. When they wish to exhibit the gold, they remove the loose rock with a shovel, and splash water over the rock and wash the dirt away. The sight is a dazzling one, and no words can give an adequate description of it. So many men are applying daily to see the gold that the owners have been compelled to refuse hundreds. It would keep one man constantly employed if it were on public exhibition. Indeed, it is strange that the old miners do not charge a dollar for the privilege of seeing the ledge. They would coin money by adopting such a suggestion. The ledge enters a mammoth cliff of slate, and is widest at the place where it enters the cliff.—Nugget.

Stampedes.

The danger of stampedes is one which all new settlers in mining camps must figure on. Let's figure. Three thousand men are in the mining district. They have come early, purposely, in order to get chances for investment. They knew when they came that they were a month or two ahead of schedule time—that no mines could be opened, and few prospected until the snow began to melt. Suppose twenty-five hundred of these men got broke, and the supposition is not unlikely, and rush back home. That is called a stampede. Men are crazier than cattle or horses. They are about like sheep. If one jumps over a fence, or into a ditch, the crowd follows. If a few men give a camp a black eye and leave, hundreds will follow. Leadville had a stampede, in her palmy days, and it lasted some months. The Cœur d'Alene had a stampede on a small scale last summer. Suppose another should occur. It isn't probable, but we are figuring on the possibility. Suppose the towns over built, property acquires fictitious values, and the boom should collapse in a stampede. It would take grit and nerve to remain. Like a flock of sheep or frightened cattle we would all catch the infection and feel like running away. But some would remain. Some are hobbled with claims and town property, and can't run. Some are tethered to business and must stay. A few are long-headed enough to stay anyway. Suppose we stay. Desirable property will come down to a reasonable figure. A little capital will secure something like its value. We will reap where the stampede has sown. Pretty soon, it may be months, it may not be six weeks, the tide will again set this way. Thousands will come instead of the hundreds who are now here, just as hundreds have now come instead of the tens who were here last summer. Then comes our harvest. The few who remained here during the long, weary winter are all doing well. They have mining property and town lots. Those who remain during future stampedes will make fortunes. We write this with no belief in a present stampede. There is too much gold in sight, and too many men doing well, for any serious rush to the railroad to occur speedily. But, in all likelihood, there will be partial stampedes before the mines are much older. Many men who came here with a thousand dollars one month ago are getting hard up; some who came with five hundred dollars are broke, and few that came with a hundred have anything left, unless they are willing to work. There is plenty of work, but stampedeers are

not looking for that kind of a layout. After figuring carefully, we don't see that a stampede or two would do any great harm. We would hardly miss those who are dead broke, before their places will be taken by men of means, by prospectors and laborers. These latter classes are coming in so rapidly that there cannot be a stampede. The incoming population must constantly outnumber the outgoing. Still, if it would be a genuine benefit to the camp to change off its poorer occupants for a better class, let us side with the croakers until the change is effected. Let us one and all cry *Viva la Stampede!* But we won't stampede. We will stay.—Cœur d'Alene Nugget.

The Lead Market.

The Salt Lake Chronicle says if the tariff tinkers will let lead alone the prospect for fair prices for that article the coming season is good. The Morrison bill now before Congress for defeat, we trust, proposes to reduce the tax on lead 15 per cent. This reduction, with the price of lead steady at \$4.25 in New York, would probably enable foreign holders of lead to flood our market. It is to be hoped that if any reductions are to be made on imported articles, lead will remain untouched. The lead interests, or in a larger sense, the lead-silver industry, will suffer materially should the tax on lead be reduced. Already at present prices of lead there are large deposits of low grade silver-lead ore which cannot be handled with profit. Reduce the tax, and mines now barely paying will be closed. Aside from the tariff matter, the prospect of immediate and permanent advance to a paying point in the price of lead is promising. Owing to various reasons, prominent among which is the unusual fall of snow in the mountains all through the mining districts, the outcome from mine and smelter will be less for the next few months than usual. This is but temporary, of course. There are permanent causes at work. As depth is reached on our silver-lead producing mines, it is generally true that the percentage of lead decreases. In the meantime, with the growing trade and activity of business in all departments, the general demand for lead, as for all the useful metals, is continually increasing. The promise of supply is not likely in the future to keep pace with the demand. And this is true of gold and silver as of lead.

The mining districts of the world are being largely explored. The maximum of production seems already to have been reached, and we are on the descending grade. Improved processes of reduction, larger combinations of capital at less cost of usury, with improved facilities for transportation, will lessen the cost and relatively increase the profits of mining in the future. Of all industrial pursuits, mining is king; that is, its products are absolutely necessary for the uses of trade; they are less liable to fluctuation in price and appreciate in value as other commodities diminish. In times of great financial depression and panic the production of gold and silver, with attendant lead, is the only business that holds its own as master of the situation.

Let the man who holds a vein of lead with small value of silver therein perfect his title to the same and "wait for the wagon," for the time will soon come when such veins and deposits will be worked to profitable advantage.

QUARTZ AND DRIFT MINES.—The Mayor of Marysville on reading his inaugural recently before the Common Council of that town, said: As to the quartz system of mining, the assertion that we are antagonistic to its continuance is made only by those whose personal interest in the hydraulic mines leads them to desire the support of the quartz interest. This assertion is not worthy of refutation. Regarding the drift system of mining, where only the pay gravel is removed, we are assured from the statistics in our possession that the debris coming from their operations is so inconsiderable in amount as to do no appreciable injury, and we cannot doubt if those engaged in drift mining use all effort to make as little deposit in the rivers as is practicable, we shall have no occasion to complain. No system of mining would be tolerated that should increase the filling of her river channels. It is the belief that the drift system of mining can be so conducted as not to injure the valley that leads us to disclaim any opposition to it. If drift mining is carried on in a manner not materially injurious to the valley—that is, not detrimental to the carrying capacity of our rivers—it will never be disturbed. We are not contending for clear water, but the rivers must be brought to such a condition that not only further filling of their channels shall cease, but from this time on their channels shall constantly scour out and deepen. Companies not now resting under an injunction, that are furnishing water to quartz, drift and hydraulic mines, as well as for domestic purposes and irrigation—if they desire to avoid litigation and an injunction that shall tie up their property, have only to cease furnishing water to those engaged in hydraulic and sluice mining, and they will not be proceeded against. This great public nuisance has been occasioned solely by hydraulic mining, and we must never rest until all mines worked by the hydraulic system, or any other method of mining, whatever its technical name, that slices the whole face of a bank into the river, shall have ceased their operations.

MECHANICAL PROGRESS.

An Unusual Grouping of Steel Rails.

The following curious fact is noted by the *Industrial World*: "At a somewhat important junction in one of the smaller Western cities there are to be seen, in the track of the branch line, within the distance of one-third of a mile, no less than ten different brands of steel rails, all in current use and rather heavily traveled upon. These ten names include three English works, one French, one Eastern work in this country, three which may be called central, and two Western works. These rails appear to have been gathered from time to time out of the remnants of larger shipments made to central points on other parts of the main road of which this branch formed a part, or to have been picked up occasionally as left along the track when changes had been made from iron to steel. All were in excellent condition, and for obvious reasons no pretense could be made of a comparison between them. A rather interesting illustration was thus afforded of the wide range in the sources of supply of such construction materials, and of the difficulty of controlling the inevitable variations in the quality of the product when received from so many different hands and made up of such various and dissimilar materials. It is a little difficult to believe that these rails, from so many makers' hands, could have been any better suited to their purpose, or could have been absolutely guaranteed as of the best absolute quality, if they had been made under any arbitrary quality whatever, and not made (as they undoubtedly were, whether good, bad or indifferent) with a reasonable sense of responsibility on the part of the maker, as measured in part by his own study of the general range of tests required, and of the raw materials at his command."

STRENGTH OF PORTLAND CEMENT.—The Portland cement, as it comes from the factory, is composed of an almost impalpable powder, mixed with coarser grains which have but little adhesive quality. Mann's experiments have shown that in a trial of seven days the portions which pass through a No. 176 sieve (31,000 meshes per square inch) exhibit five times the adhesive strength of those which pass through a No. 103 sieve (10,600 meshes per square inch). The necessity of fine grinding is therefore obvious. In ordinary cement 45.6 per cent is stopped by the No. 176 sieve, which is the finest that is made. The force of cohesion is much greater than that of adhesion, varying from threefold to tenfold. The adhesive force upon different substances, such as stone, brick, slate, marble, glass, etc., varies greatly. The degree of surface polish has less effect than one would think. According to these experiments, the best test of Portland cement is its adhesive power. The No. 176 sieve ought not to stop more than 45 per cent of the cement; the part which traverses the sieve should have an adhesive force of 95 pounds, and the unsifted cement of 75 pounds per square inch. —*Chron. Industr.*

BRONZING IRON.—Iron articles are easily coppered or brassed by dipping in copper solutions, or else coppered or brassed by the galvanic method; these coatings also scale off after a short time, especially if the iron surface was not thoroughly cleaned, when exposed to the influence of moist air. By the following process it is easy to provide iron articles with a handsome bronze-colored protide coating; it resists the influence of humidity pretty well, and besides this, the operator has it in his power to produce any desired bronze color in a simple manner:—The cleansed and scoured articles are exposed to the vapors of a heated mixture of concentrated hydrochloric and nitric acids (1 and 1) for from two to five minutes; and, then, without unnecessarily touching them, heated to a temperature of 300° to 350°. The heating is continued until the bronze color becomes visible upon the articles. After they have been cooled, they are rubbed over with petroleum jelly, and again heated until the jelly begins to decompose. After cooling, the article is anew rubbed over with petroleum jelly. If now the vapors from a mixture of concentrated hydrochloric and nitric acids are permitted to operate upon the iron article, light red-brown tones are obtained. However, if acetic acid is mixed to the mentioned two acids, and the vapors permitted to operate upon the iron, oxide coatings are obtained, possessing a handsome bronze-yellow color. All gradations of colors from dark red-brown to light red-brown, or from light bronze-yellow, to dark brown yellow, are produced by varying the mixtures of the acids. —*Dinglers Journal.*

TESTING MACHINES.—The prominence which has lately been given to the discussion of improved testing machines, both at the meetings of the different engineering societies of the country and in the scientific press, naturally brings to mind, by way of contrast, the fearfully and wonderfully made contrivances for testing one used to meet with in iron works and foundries in former years. The improvement in testing machines has, however, merely kept pace with the clearer perception of the various physical qualities of metal to which makers and users of iron and steel have come, and so the worst that can be said of these primitive fixtures is that, while they never did any good, they never did much harm, as their use, from the very crude-

ness and evident inaccuracy of the apparatus, was rather short-lived. Good testing machines are now manufactured at prices which bring them within the reach of most works, and with the better appreciation of their value to the iron-worker has also come a clear understanding of the fact that a testing machine must, above all, give correct results to be of any use whatever. —*Iron Age.*

WATER IN BOILERS.—The danger of allowing water to assume the spheroidal condition in steam boilers is generally recognized; and M. Melsens has investigated the causes which conduce to this state. He has found that when the shell of a boiler is roughened with many points, water boils at the same temperature as that which in a perfectly smooth boiler will produce the spheroidal condition. The demonstration of this fact has been shown by the following arrangement: A dish representing the bottom of a boiler is divided into two equal parts, one of which is made perfectly smooth, while the other is covered with little pointed metallic cones, soldered to the plate. The dish is raised to a uniformly high temperature by a gas furnace, and then a quantity of water is poured simultaneously into both compartments, rising high enough to just cover the points of the cones. In the smooth compartment the water will pass into the spheroidal condition and not enter into ebullition; in the other, the ebullition will be lively so soon as the water covers the points of the cones. The same phenomenon occurs when the water has, by long boiling, been previously purged of its contained air. It remains to be proved whether this experimental fact can be utilized in the construction of boilers, in order to suppress or diminish the disasters arising from overheating. —*Scientific American.*

SELF-PRESERVING IRON.—To the chemist it has long been a wonder that the oxides, which in large mills amount to no insignificant sum thrown away, had not been utilized for some purpose in the arts or manufactures, when it was a notorious fact that iron in the form of rust contains all the primary requisites as an effectual preventive of the recurrence of rust, the great question being some manner of application, that would act the same in all climates and situations. Circulars and samples lately received from England seem to indicate that this question has been solved, for a factory for the manufacture of rust paint has been established at Bownessfield, a small borough near the famous steel works of Elton. This firm obtain their scales from these works and other rolling mills adjacent, as it passes from the machines, and by processes known to themselves is manufactured into paint for iron. Thus we may have steel structures painted with steel and apparently this steel covering will last forever. The scales of rust may be reduced by crushing to a powder possessing not a particle more grit than wheat flour, after which it is readily mixed with oil and the shade of color desired is made the same as other paints. It is stated that a ship's bottom was painted with this new discovery of an old product, and made the voyage from London to India and return without even the slightest indication of barnacles or grasses.

A FINE FINISH FOR STEEL.—A fine lusterless surface on tempered steel can be procured by either of the following operations: After the steel article has been tempered it should be rubbed on a smooth iron surface with some pulverized oil-stone, until it is perfectly smooth and even, then laid upon a sheet of white paper and rubbed back and forth until it acquires a fine dead finish. Any screw holes or depression in the steel must be cleaned beforehand with a piece of wood and oil-stone. This delicate lusterless surface is quite sensitive, and should be rinsed with pure soft water only. A more durable finish is obtained by smoking the steel surface with an iron polisher and some powdered oil-stone, carefully washing and rinsing. Then mix, in a small vessel, some fresh oil and powdered oil-stone, dip into this mixture the end of a piece of elder-pitch and finish the steel surface with a gentle pressure, cutting off the end of the pitch as it commences to become soiled. In conclusion, it should be thoroughly cleaned in soft water, when the article will be found to have a fine lusterless finish. —*The Amateur Mechanic.*

FINE WIRE.—We recently alluded to some very fine drawn platinum wire, fine enough for cross hairs of telescopes, but too weak to handle. The *Scientific American*, in reference to the same, says that Dr. Wollaston published, as long ago as 1813, an account of his making a wire only one-eighteenth thousandth of an inch in diameter. The size ordinarily use for field transits is platinum wire of 0.003 inch, covered with silver to 0.1 inch; this drawn to 0.003 inch will leave the platinum, when the silver is dissolved off, to be 0.00009. This wire will sustain a weight of four grains or a ball of wax the size of a pea.

To prevent the cracking of the glass tubes which are connected with steam boilers to show the height of the water within, and which is of a more or less frequent occurrence, as the tube is of a high temperature inside, and a cold current can strike them from the outside, the *Industrie Blatter* recommends the use of two glass tubes, one within the other. The air which is confined between the two serves as a protection to the inner tube against outside cold and the outer one against the high temperature of the inner one. Both tubes are packed in brass couplings, and form one single instrument.

SCIENTIFIC PROGRESS.

The Theory of Magnetism.

At a recent meeting of the Royal Institution, Professor D. E. Hughes gave a lecture on "The Theory of Magnetism," illustrated by experiments. The mechanical theory of magnetism may be deemed to be the proper style and title of that brought forward by the lecturer. The phenomena of magnetism he explains by a simple rotation of the molecules of iron, as well as of all metals; nay, more, of all matter—solid, liquid, gaseous, or ether. All matter according to his views, has inherent magnetic power, varying in degree in molecules of different nature, but not to any great extent.

The lecturer demonstrated each portion of his theory by experiment, so that the effects were visible to the audience. The striking effects of vibration, torsion, or mechanical strain upon the destruction or creation of manifest magnetism he showed in a variety of ways, the soft iron obeying the slightest mechanical tremor; while hard iron or steel resisted the most violent treatment. The molecules of the same bar behaved with extreme freedom, as in the instance of soft iron, but when a slight strain was put upon them, as when slightly bent, like an archer's bow, the bar became as rigid as steel, and mechanical action had no longer any effect.

A detailed account was given of the lecturer's researches upon the atmosphere, in the course of which he has discovered that it has a saturating point, like iron, and that it is just like iron itself. This was illustrated by striking experiments upon the magnetism of the atmosphere as compared with that of iron, and with the effects of vibrations in allowing freedom of motion to magnetic conduction in iron, by means of which a magnetic pole was pushed forward to four times its previous distance. Heat and electricity produced like effects, when Professor Hughes drew the conclusion that these three forces, each allowing molecular freedom from frictional resistance is lessened, must have a like origin, and that electrical currents can be fairly classed with heat as a mode of motion. When a bar of soft iron is strongly magnetized, as in the instance of an electro-magnet, it returns, like a spring, to a neutral state upon the cessation of the inducing force.

This well known fact has long remained a mystery. All theories of magnetism up to the present time supposed that the molecules became, on the removal of the induced current, mixed or heterogeneous. Professor Hughes believes he has made a great discovery in having solved this problem, leaving no mystery any longer, as the demonstration which he will soon bring before the Royal Society will reduce the matter within the domain of absolute fact. He proved his case before his audience at the Royal Institution in a less formal way, but quite as effectually, rendering a bar of iron sensibly neutral or polarized at will by simply turning it upside down. The mechanical inertia of the molecules was demonstrated by magnetizing a bar, that heat is a mode of motion, and that the molecules of the most solid bar of iron can move in a certain space with comparative freedom, the oscillations being greatly increased with every rise in temperature. If, as already well-known, the molecules can move in all planes, then there could be no valid objection to the idea of their rotation, in fact, they were known to rotate in the act of crystallization. Thus, according to Professor Hughes, magnetism is an endowment of every atom of matter. —*Scientific American.*

CONCERNING METEORS.—In the course of a series of instructive lectures on astronomy, recently delivered in New York by Prof. C. A. Young, of Princeton, that gentleman spoke of meteoric bodies as follows: Meteoric particles are striking the earth at all times. Some astronomers estimate that as many as 10,000,000 particles strike the earth each day, while the lowest estimate puts the number at 7,500,000 per day. Many more of these particles strike the earth in the morning than at night, and frequently observing persons in their morning walks can plainly see evidences of the meteoric showers. These meteoric particles seem to be circulating in space, and the earth as it moves in its orbit, strikes against them. Some of the meteoric showers are very copious and very bright. One writer has likened a meteoric shower that he saw to a snow storm, the flakes being of fire instead of congealed vapor. The majority of the meteors that strike the earth are stone, and not iron, as is commonly supposed. Some, however, are of pure iron. Out of the 500 or 600 meteoric stones that have been found on the earth and preserved, not more than ten were iron. Astronomical observers have detected, by means of the spectroscopic, sodium, magnesium and sometimes iron in these bright shooting stars. One consequence of this constant falling of meteoric particles, is that the earth is growing larger; but the lecturer said that there was no immediate danger of any radical change taking place in the surface of this sphere, for at the present rate of meteoric fall, it would take 500,000,000 years for the earth to gain one inch of surface. Meteors are known to come in periodical showers, probably the most remarkable being the shower that occurs about the 11th or 12th of November. It appears that meteors follow in the track of comets. They are related to comets in some way or another, but exactly how the lecturer was not prepared to say. Some

scientists thought that the meteors were the debris or cast-off particles of comets, while others thought that perhaps the comets were simply aggregations of meteoric particles, and the falling stars were the particles that did not get into the aggregations. It is certain, at any rate, that flocks of meteors follow the various comets at a few millions of miles behind.

THE ZODIACAL LIGHT.—The cause of the luminous phenomenon known as the zodiacal light has long been the subject of speculation, and numerous hypotheses have been suggested to account for it. A correspondent of *Cosmos les Mondes* regards the entire phenomenon as one of the reflection of light. What we observe is nothing but the reflection of that part of the earth which is illuminated shortly before the sun rises and after it sets. In order to understand this we must assume that the earth is surrounded for a certain distance by a comparatively dense envelope of gas, beyond which the latter exists in a state of great attenuation. We therefore have two media of different density which influence the rays of light in the well known way, refracting them up to a certain limiting angle of incidence, beyond which total reflection takes place. If we imagine the sun a little below the horizon, a part of the earth directly in front of us will reflect the rays of the sun at a very obtuse angle; these rays, meeting the boundary of the media at a very obtuse angle, will be totally reflected, and it is these totally reflected rays which we see. This explains the appearance of the light in the shape of a cone whose line is always inclined in the direction of the ecliptic, and whose base is toward the sun; it also accounts for the fact that the changes observed in its appearance follow a reverse order in the evening from that in the morning. The reason why the cone is longer in the evening than in the morning is that the layer of dense atmosphere is expanded by reason of its exposure to the sun's radiation through the entire day, whereas in the morning the reverse is the case.

VELOCITIES.—An interesting table of velocities has been drawn up by Mr. James Jackson, the librarian of the Paris Geographical Society. He begins, says the *Photo News*, with the velocity of a man walking two miles and a half an hour, and after alluding to the respective velocities of an ordinary wind, of a race horse, of an express train, of a carrier pigeon, of a hurricane, of sound in air and water, he brings us at last to the velocity of heavenly bodies, of electricity, and finally of light. But Mr. Jackson has left out one important velocity, which has only been recently computed, and which is of singular interest, since it represents the only earthly agent known to man with a velocity quicker than sound in water, although naturally less quick than electricity and light; we mean the detonation of the photographer's old friend, gun cotton. Abel and Noble have computed that a train of gun cotton, fired with a fulminate fuse, will transmit the detonating action at a speed of from 17,000 to 19,000 feet per second. In other words detonation travels at the rate of 200 miles a minute, while next in order comes electricity, traveling through a submarine wire at a speed of some 12,000,000 feet per second.

PRACTICAL SCIENCE.—An instance of the practical application of science to every-day life is well shown in the building of the capitol building of Dakota, at Bismarck, by the aid of electric light. This building, costing a quarter of a million of dollars, consists of three stories, basement and sub-basement, measuring a hundred and fifty-five feet by ninety-two feet, and contains over four million bricks, with trimmings of Joliet stone, and has been erected in the midst of winter. The corner-stone was laid Sept. 5, 1883; and on the 10th of January, 1884, a few days more than four months later, a photograph shows the building to lack only the projection of one side and the upper part of the tower. This result was accomplished by the employment of electric light, which half the time replaced the sun, enabling double gangs of men to work day and night. The frozen sand was thawed by a red-hot cylinder, and the mortar, made with boiling water and hot lime, had its moisture absorbed by the dry bricks before it had time to freeze. Although taller, the building is an almost exact duplicate of the new capitol of Minnesota.

CANNED FRUIT.—Mr. Winter Blyth has recently been employed to analyze imported canned fruits (apricots, tomatoes, etc.) in order to ascertain the amount of contamination by metal in them. In twenty-three samples the amounts found, calculated as stannous hydrate, ranged from 1.9 grains to 14.3 grains per pound, the mean amount being 5.2 grains. The juice and fruit in some instances had a metallic taste. Several of the tins showed signs of corrosion. The *Journal of the Society of Arts* says: The little that is known of the action of stannous hydrate may be summed up in a few lines. Doses of about 174 gram per kilogram of body-weight cause, in guinea pigs, death with signs of intestinal irritation; but with doses smaller than 17 to 2 gram the effects are uncertain, and the animals generally recover. Hence, supposing a man to be affected in the same proportion, he would have to take from three to four drams, or consume at a meal ten pounds of the most contaminant of Mr. Winter Blyth's tinned fruits. But it is not a question of immediate deadliness; it is rather one for inquiry as to the action of small repeated doses continued for a long time.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

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Passing Events.

Among the mining items of note is the discovery of new mines northeast of the Pikes Peak or Yambelle district, in Montana, and not far distant. The mines are placers; we refer to the subject in our Mining Summary. The Spicer district, some seventeen miles from Quijotoa, Arizona, is also now attracting attention. A great excitement was raised last week in Colorado about new gold fields at Pisgah. A regular stampede set in from Denver and elsewhere. It has been found already, however, that the whole thing is a fraud, a job put up by somebody.

The Cœur d'Alene rush still continues, but many contradictory reports come from the new mines. Of late many letters written from there give the mines "a black eye." A few weeks more will tell the tale, however.

A BIG PAYING MINE.—The Bald Mountain Extension Co., in Sierra county, recently made the largest clean-up ever had. It was 217 ounces, \$4,036.20, the gravel averaging \$3 per car-load. During the past three weeks they have taken out 540 ounces, \$10,044. A dividend of at least three cents a share will be declared for this month on the Extension stock. The yield of the mine for the first three months of this year was \$25,924.84. The pay roll during that time was \$11,555.75. Total proceeds gold dust since pay gravel was first struck in the lead was \$115,610.44. The main tunnel is now over 650 feet in the lava flow, beyond which will undoubtedly be found the extension of the pay channel. Total length of main tunnel over a mile. Sixty-five men are now constantly employed. Total amount of assessments levied to develop this mining property, \$57,390.

Progress of Mining.

It was not very many years ago that the precious mining industry of the United States was confined to a comparatively small area. It was in California and Nevada that the principal work was done, and few of the big mining magnates cared to have anything to do with any of the mines which had been found in other States or Territories. In fact there were not any big mining magnates to speak of; but such as they were, these men preferred to deal with such mines as could be readily managed from San Francisco as a center. Gradually the California mines came to be neglected by these men, and their whole attention was then turned to the Comstock lode in Nevada, where the most extensive mining was carried on.

As one after another of the famous mines of that lode showed up a rich spot the attention of the mining world was still more concentrated in that locality, and men found it exceedingly difficult to get any capitalist to look at anything anywhere else. By and by the famous bonanzas were opened, and then there was no chance for any other region.

With these discoveries came the day of extravagant ideas, expensive machinery, immense outlays and sudden and magnificent fortunes. During this time the mining regions of the rest of the country languished for want of capital or other encouragement. To California indeed this, though at the time considered very unfortunate, was a good thing. The miners here learned to rely more on themselves and became much more economical in their conduct of mining operations. Instead of there being many "one mine camps" each camp began to develop its small mines. The result has been that the State of California has been able to maintain steadily the first place as a gold producer and the second place as a gold and silver producer, notwithstanding the lack of encouragement from capital. Each year there is a great stir from some of the other States and Territories about what they are going to do, and each year California turns up ahead of all but Colorado, which a few years ago wrested the first place from Nevada.

But while the wonderful results were being accomplished on the Comstock the miners elsewhere were hiding their time. The newer regions of the United States were gradually receiving additions to their population and the miners were roaming over the hills and mountains and hunting up new locations for themselves.

The discovery of the mining regions of Leadville at Colorado perhaps did more to attract the attention of the people west of the mountains to precious metal mining than any other thing—even the bonanzas of the Comstock. The mines were nearer them and the rich ore developed yielded so much that it attracted the thoughts of many all over the country.

The possibility of gathering wealth from this business having been impressed upon the people East, who had only looked upon mining as a sort of adventure or precarious occupation, the mining industry became a more legitimate thing in their eyes. Thousands of men who had not before thought of the matter, suddenly became interested, and the result was an influx of capital to the mining regions and a large accession to the number of prospectors in the country.

The building of railroads in the southern and northern part of the United States has had the effect of opening up regions before left to the Indians almost exclusively. With means of transportation at command, and some protection for life and property assured, these regions referred to have rapidly settled up with a community progressive and energetic in its nature, and both ready and able to found new States, and wrest from the earth and soil the latent riches they possess.

In Arizona the Tombstone mines have become famous for their yield of precious metals, and the Bisbee mines for their wealth of copper. But half a hundred other districts, not so noted, but with great possibilities, have been discovered and developed. The whole territory seems to be prolific of mineral, and it is only now in its infancy of mining development. New Mexico, while it has been somewhat unfortunate in being "boomed" before it was quite ready, has shown up some good mines, and has hardly begun to make the showing it can by and by.

The great Black Hills excitement also added its influence in bringing about the revival of in-

terest in mining. The mining region of Dakota, though not so wide in area as that of other States and Territories, has proved a profitable one. Some of the mines have proved exceedingly rich. To these mines, too, came a large number of people who had never before been connected with mining in any of its branches.

But perhaps the most remarkable strides which have been taken of late years have been made in Montana and Idaho. The mines of the Wood River region, in the latter Territory, and those of Butte, in the former, have attracted large numbers of men to the North. The developments which have taken place have been very satisfactory, and the mining fields are widening. It is yet too soon to speak with any degree of certainty of the new placer regions of Idaho, which are the object of the present prevailing excitement. Utah is rather quietly making for herself a reputation for producing mines, and her bullion product is steadily and surely increasing. Some of the noted mines within her boundaries have done her more harm than good from the reputation achieved by their manipulators; and some earlier mistakes were disadvantageous. But now she has a few mines of wonderful richness, and a very wide available mineral region. With very little flourish of trumpets Utah is making developments and bullion shipments which are rapidly leading her name towards the top of the list for bullion production.

The progress of events show that gradually more and more attention is being directed by the American people to the rich mining fields of Mexico. Already some hundreds of mines within her borders are owned by companies formed of citizens of the United States. Individuals are investing there, too, and notwithstanding the drawbacks of lack of means of transportation and the dilatory habits of the people, great strides are being made. The introduction in the mines there of modern mining machinery and appliances, as well as American habits of industry and energy, will sooner or later work a complete revolution in mining matters. The country has for centuries been noted for the richness of its silver mines, and many of them have only been worked to moderate depth, and with crude appliances. With the increase of railroad facilities, the prospects of that country and its mines will be very greatly improved. In Oregon and Washington a certain amount of mining development is going on; but as compared with other regions, it attracts little attention. In the Southern States there are many mines also, but none which have a world-wide reputation for richness.

With this progress of mining, the progress of mechanics relating to the industry has kept in pace. There are foundries and machine shops all over the country that make machinery for use in mines. Naturally, California keeps in the lead in this branch, having had the longest experience. The mining appliances made at the foundries of San Francisco have a reputation all over the world for strength, durability and adaptation.

The mining industry is now so firmly established on a legitimate basis in the United States that all questions as to its being a business in which men can engage without being looked upon as speculators are idle. True, the taint of the stock market is somewhat too strongly fastened upon it, but the signs of the times and our present experiences show that this will be a constantly lessening evil.

Anthracite Mining Methods.

The pillar and breast system is the one by which almost all anthracite mines are worked, but the details of the system under different mining conditions vary so widely that a comparison of mine maps from different districts, or a hasty trip through collieries in different localities, gives the impression that the coal is mined by several systems having nothing in common, but a close inspection discloses the fact that they all have three identical features: 1st., the breasts or rooms, or working places, are all long and comparatively narrow; 2d., they are driven nearly parallel to each other, and 3d., they are separated by long, narrow pillars of coal, broken only by small openings for ventilation.

These features, common to all anthracite workings, are the identifying characteristics of the "pillar-and-breast," "pillar-and-room," "post-and-stall," "stoop-and-room," or "board-and-pillar" systems.

At present beds of from three and a half to four feet up to 60 or 70 feet are worked, and on dips varying from horizontal to vertical, and it is a somewhat remarkable fact that the same general system can be employed in mining the coal from a six-foot bed lying nearly horizontal, that is adopted in working a 50-foot bed standing nearly vertical; but the details of such working differ materially. The plans in use at present may be divided into two classes: 1st., workings on beds dipping from zero, or horizontal, to an angle of about 25 degrees; 2d., workings on beds dipping from 25 degrees to 90, or vertical. These two classes may be appropriately termed "flat working" and "pitching," or "steep workings."

Seventieth Birthday Reception.

On Friday evening last a very pleasant social event occurred at the residence of Mr. W. B. Ewer, of the firm of Dewey & Co., the occasion being the celebration of Mr. Ewer's 70th anniversary. About 125 of his friends came to present their congratulations. Appropriate remarks were made by Mr. Bacon, Rev. Henry A. Sawtelle, Dr. Cleveland and others. Dr. Blake presented Mr. Ewer with a handsome gold-headed cane from members of Ivy Chapter, Order of Eastern Star. A number of other presents were received from friends and business associates. Parlor theatricals, music and conversation enlivened the evening and a bounteous repast was served. The toilets of the ladies present were exceptionally fine, and the evening was heartily enjoyed by all so fortunate as to be present. The floral decorations and offerings were remarkably elegant. During the evening the following poem was presented by A. T. Dewey:

A Birthday Poem.

Respectfully dedicated to W. B. EWER, A. M., a pioneer veteran of the press of California; written on the occasion of his Seventieth Birthday.

Hail to "The Press," and to the band
That built its temples in our land!
To hands that toiled, to feet that sped,
And to the stalwart brains that led
Our pioneers through the maze
And fever-heat of early days!

Hail to the men who long have wrought
Their jewels from the mine of thought!
Who've sent, equipped and manned with might,
Crowned with the truth, and winged with light,
Their thoughts and inspirations grand,
Like armed warriors through the land!
Hail to the pioneer who came
With Printing Press to lead and tame
The fiery spirit of a band,
That revelled in the Golden Land!

The years have sped, matured and ripe,
Now stands our "Veteran King" of type;
The sun of time has sweetly shed
Its silvery halos round his head,
Yet in his soul there is a glow
That shone so buoyant long ago;
The same determined zeal that made
Him knightly master of his trade.

The suns of seventy years have set,
The golden spark is shining yet;
The placid current still flows on
Through fields whose prizes have been won—
With no discordant note to mar
The beauty of eternal law.

Though seventy years have come and gone,
The regal spirit still shines on—
For no unmanly vice is soil
A life refined by useful toil;
No dissipation leaves its sign,
No dark extreme to mar the line
Of noble virtues that proclaim
The record of an honored name.

Hail to our brother toiling still,
Life's blessed purpose to fulfill!
And ere my earnest rhyme is spent
In heartfelt wishes and intent,
From the sweet opening blossoms of spring
A modest garland would I bring,
And twine its blossoms with the lay
I sing upon his Natal Day!

E. A. P.

San Francisco, April 22, 1884.

Labor Items.

The Labor Bureau of statistics find difficulty in getting answers to the questions they send out. It seems that people do not care to disclose their operations.

Some 300 fishermen man the 1500 boats engaged in salmon fishing on the Columbia river.

At the Oakland nail works the green hands are still learning to do the work with the nail machines.

The harness makers and sash and blind makers complain of the competition of State Prison labor.

The season for building is just now commencing, and soon all our carpenters will have their hands full.

There is active inquiry for domestic labor. When the fruit and vegetable season opens, as it will shortly, there will be plenty of chances for our young people who are now idle.

A large proportion of the immigrants who arrive here are day laborers. Our local immigration association discourages this class, as there are so many here now and desires only to encourage those who wish to settle on the lands which may be cultivated.

The journeyman painters of this city have formed a benevolent organization for mutual protection and benefit, and also to co-operate with other labor organizations. Charles H. Ward was elected Chairman and J. M. Manning Secretary. After considerable discussion it was resolved that after the first Monday in May \$3.50 per day shall be the standard rate of painters' wages.

On Rock Drills.

(CONTINUED FROM PAGE 285.)

3,000 pounds per square inch. He has successfully overcome the difficulties at first encountered in the use of water under high pressure. The necessary machinery above ground is simpler and cheaper than any equally effective plant for compressed air, and consists only of a simple, quick-running pressure pump, run by a steam engine or by water-power, and of an accumulator. The useful effect of such a plant is not less than 71 per cent of the motive power employed, against 32 per cent in air compressors. In consequence of the high water-pressure the dimensions of the machinery become very small, the plant is cheap and the maintenance easy, compared with compressed air plants. [The cost of the plant at the Arlberg tunnel, where percussion drills were used on the east side and Brandt drills on the west side, amounted to \$161,494.49 at the east and to \$120,996.12 at the west end. These amounts include only the necessary machinery, but not the buildings, grading and water-power, furnish therefore a good base for a fair comparison. The difference in favor of the Brandt drill is \$40,503.37.] The loss of pressure through friction in the pipes is very small. All the disadvantages of the use of compressed air are avoided by the use of water under high pressure as motive power for rock drills and other underground machinery, and a number of direct advantages have been gained. In reference to ventilation, it has been shown above that even with compressed air a separate plant for ventilation is necessary. This is also the case with the hydraulic rotary rock drills, which, however, offer yet the advantage that water of high tension can be used to condense and absorb at once the fumes and smoke of the blast in such an effective manner that the face is accessible in a very few minutes after the charge has been fired. The fine spray of water creates a strong movement of the air. To use this most effective means of ventilation with any percussion drills worked by compressed air would require a separate plant. It has thus been shown that the transmission of power by water under high pressure and its application to rock drills and other underground machinery is not only practicable, but also superior to compressed air.

The rock drills of the present day can be divided into the following three groups: 1, percussion drills; 2, rotary drills with diamond bits; 3, rotary drills with steel bits.

Percussion Drills.

The percussion drill with the fore and backward motion works by the weight of the drill being thrown against the rock, exercising thereby such a pressure upon the same that its crushing strength is overcome and the rock is pulverized. The drill-bit is made to turn around its own axis, and an approximately round hole is made by frequent and quickly-repeated blows.

Diamond Drills.

The diamond drills rotate the bit rapidly and press with a low pressure against the rock. The drill hole is made only by the grinding and shaving action of the bit. The principle of this drill is based upon the greater hardness of the tool. The crushing strength of the rock does not play any part in the work of the diamond drills. They can never be used under high pressure, as the crushing strength of diamonds is small in comparison with that of other materials. These drills work better in homogeneous solid rock of uniform structure than in stratified rock of unequal hardness and consistency; they do not work at all in softer ground. This is the reason why the diamond drills occupy an isolated position among the rock drills. Their principle is different from that of any other drill, and permits their use only for deep hole drilling, and not for common tunnel and mining work. They cannot be considered rivals of the usual rock drills.

The rotary drills with steel bits—outside of the Brandt drill—are partly imitations of the diamond drills, and operate with spiral steel bits, which are rotated by some mechanical device, being simultaneously pressed against the rock, and producing the hole by combination of the shaving and pressing action of the boring tool. This kind of drills can be used only in soft material; in hard ground the pressure is not

sufficient, and the shaving motion wears off the steel points very rapidly.

The Brandt Drill.

The principle of the Brandt hydraulic rock drill is different from any of the percussion or rotary drills. Mr. Brandt uses in his drill a constant high hydraulic pressure, which presses the drill bit with such a force against the rock that the latter is crushed under all circumstances, as the crushing strength of hardened steel is greater than that of any known rock. [Hardest granite is crushed under a pressure of 19,662 pounds per square inch. The pressure upon one cutting edge of Brandt's drill is equal to 2,645 pounds, or to 56,384 pounds per square inch.] The points of the drill bit, provided the necessary pressure is applied, must also penetrate into the rock. In order that these points always exercise their pressure on fresh ground, they have to be rotated, by which rotation the rock is crushed and broken, but not pulverized and shaved. These two points: quiet high pressure on hardened steel, and slow rotary motion, to overcome the crushing strength of the rock, form the principles of the Brandt hydraulic rock drill. The pressure, being constant, and being exercised only in one direction, the mechanical labor required is less and the percentage of work accomplished is greater than in any percussion or rotary drill.

It has been proven that the actual useful effect is from three to four times greater in the Brandt drill than in a percussion drill. This makes it possible to use the Brandt drill where too little power is at disposal to employ percussion drills. The rod and bit of the Brandt drill is hollow, leaving a large core in the center.



BIRD'S-EYE VIEW OF JUDSON MANUFACTURING COMPANY'S WORKS.

In this way only the surface of a ring has to be worked upon. The core breaks during the drilling, according to the character of the rock, into longer or shorter cylindrical pieces. The core represents the amount of mechanical labor saved in drilling the hole. [For instance, take an annular drill-bit of 2½ inches outside diameter, and a hole 6 feet deep; then 155.28 cubic inches have to be worked down to make a hole of 427.68 cubic inches solidity, while with a percussion drill, starting in with a 2½-inch drill and finishing with a 1½-inch drill, 222.51 cubic inches have to be pulverized. This shows that a much larger result is obtained by the Brandt drill, with less labor, than in the percussion drill.]

Perfectly Straight and Cylindrical Drill Holes.

The holes made by the Brandt drill are perfectly straight and cylindrical, while those made by the percussion drills are conical and not always perfectly straight. The best form of hole to obtain the greatest effect of an explosive would be one which is wider at the bottom than at the mouth. [Alex. Von Humboldt already advocated the making of such holes.] Attempts have been made to make such holes, but they have not been successful. The perfectly cylindrical hole made by the Brandt drill is the nearest approach to it. This, in connection with the large diameter of the hole, explains the fact why only a small number of holes are necessary for the face of a heading.

Comparative Mechanical Power Required.

As a percussion drill necessarily uses a full drill-bit, and as the mechanical labor required rapidly increases with the diameter of the same, the largest hole which can economically be drilled by percussion drills is, at the mouth 2½ inches, and at the bottom from 1 inch to 1½ inches, the average diameter of the entire hole being 1½ inches. For instance:

A drill 3 in diameter made a hole 12 ft. deep in 72 min.
A drill 3 in diameter made a hole 18 ft. deep in 150 min.
A drill 1½ in diameter made a hole 12 ft. deep in 80 min.
A drill 1½ in diameter made a hole 15 ft. deep in 90 min.
A drill 1½ in diameter made a hole 18 ft. deep in 135 min.
A drill 1½ in diameter made a hole 12 ft. deep in 175 min.
A drill 1½ in diameter made a hole 15 ft. deep in 210 min.
A drill 1½ in diameter made a hole 18 ft. deep in 240 min.

Although these drillings were made by hand, they will serve to illustrate the increase of the mechanical labor required with the diameter of the hole.

The Effect of an Explosion.

It is therefore customary to drill a large number of holes of smaller diameter distributed all over the face. [At the Arlberg tunnel the average number of holes for one attack in the east heading (9 feet by 10 feet, percussion drills) was 32, with an aggregate length of 170 feet, while at the west side (Brandt drills) only 13 holes, with an aggregate length of 60 feet, were needed. The amount of power used was in either case nearly 70 pounds per one attack.]

The effect of an explosive increases rapidly with the area of the bottom of the hole. If P signifies the power, which tears the rock into fragments, p the initial tension of the explosive gas, and A the area of the bottom of the hole, then we have $P = pA$.

(CONTINUED NEXT WEEK.)

A Large Manufacturing Establishment.

We give on this page a little birds-eye sketch of the works of the Judson Manufacturing Company on the bay shore near Oakland, and adjacent to the overland track of the C. P. R. R. This company manages one of the largest, if not the largest, of our home manufacturing establishments. They employ regularly some 400 hands, and pay out from \$18,000 to \$20,000 a month for wages. We take especial pride in the Judson Company, because it is doing a grand work in demonstrating that California-made implements and hardware are

Debris Dams.

It will be remembered that Congress appropriated the sum of \$250,000, on the recommendation of Col. Geo. W. Mendell, of V. Corps of Engineers, U. S. A., for the improvement of the navigable rivers of California. The intention was to build a dam, or series of dams, to impound the tailings from hydraulic mines. The Secretary of War took the liberty of withdrawing this appropriation entirely, because he did not think it would do any good. This was a proceeding without precedent. The Chamber of Commerce of this city and the city of Sacramento now petition Congress to direct the expenditure of this appropriation as originally intended.

The matter came up in Congress this week. Budd made a long argument in favor of the appropriation to impound the debris as recommended by Col. Mendell. He dwelt at length upon the ruin likely to result to Sacramento from a freshet and described the deplorable condition of affairs, at present. In 1881, Col. Mendell recommended an expenditure of \$500,000 on the construction of wing dams and levees, but in his report this year he states that \$40,000 is all that he required to continue the operations of the snag boat. Budd criticised this change of base, and attributed it to a decision of the United States Circuit Court permanently enjoining hydraulic miners. But he thought that there was more necessity for the Government taking up the work now than before that decision. According to Col. Mendell's report there were 319,000,000 cubic yards of debris still lodged around the headwaters of the Sacramento and Feather rivers, and to wait until it was all washed into San Francisco Bay would cause a damage that could never be repaired.

Glasecock and Henley explained that at the time Col. Mendell had given up the idea of asking the United States to impound the debris, the State had passed a law to do the work itself, and it was thought the problem would be solved, but that legislation had been declared unconstitutional, and the matter was in its original position. If the river was to be saved, the Government must save it. Thomas of Illinois, a member of the committee, who said he owned a portion of a Yuba County hydraulic mine, and therefore spoke feelingly, gave his experience of a trip along the river some years ago. He endorsed Budd's description as accurate. In reply to questions by Willis, Budd stated that he would ask for the amount recommended by the engineers in 1881, which was \$500,000. Glasecock also spoke upon the condition of the Sacramento and Feather rivers, and described the gradual shoaling of Suisun Bay.

Industrial Notes.

Our woolen mills are not just now doing as favorably as they should. The business is somewhat depressed.

Red Bluff rejoices in an extensive sash-and-blind factory, where there are employed 70 to 125 mechanics, whose wages range from \$2.75 to \$4 a day.

The new steel works at Martinez are being pushed to completion. The erection of the main building is going ahead, and the boiler and engine-house are also well under way. The machinery has arrived, and the company has already some orders on its books.

The Arctic Oil Works, at the Potrero, are nearly completed. The buildings are up, the machinery is on the ground, and if all goes well operations will commence within a month or six weeks. The fleet of the company left port long ago to bring home, it is to be hoped, such a catch as will bring a material reward to the promoters of the enterprise.

Some Eastern capitalists are about to undertake the manufacture of alum from the waters of Alum Lake. The Walker Lake Bulletin says: The capital required will not be great, as the plant will consist principally of extensive evaporators. The water will be run on them as required, and, as wood is plentiful, the cost of crystallization will be but slight. Mr. Kimball has been appointed superintendent of the company, and will soon begin operations. Every day new uses are being found for the article, and, as it can readily be taken to market from Hawthorne, a profitable industry will doubtless soon be added to our other resources.

One of the largest flour mills in the country is in process of erection in this State, to meet the anticipated increased demand for California flour in Europe. We refer to the Starr mills, near Port Costa, on Carquinez straits, between San Pablo and Suisun bay. These new mills are of the most improved character and will have an immense capacity. Nearly two-thirds of all the flour shipped from here has gone to Great Britain and China. We send some also to Australia, the Pacific islands, Central America, Mexico, and some East. Our shipments by water in the last twenty years have aggregated 9,749,900 barrels. Hereafter, it is hoped, our flour exports will be larger and this branch of home industry will greatly increase its proportions. Just now, however, the flouring mill industry is depressed.

The Leaching Process.

(CONCLUDED FROM LAST WEEK.)

The Discussion.

Mr. C. A. Steefeldt of New York spoke concerning this paper as follows: The first thing we may note in this paper is that an ore was treated here containing 33.78 per cent of carbonate of lime. It has generally been assumed that silver ores, which contain such a large percentage of lime, could not be successfully chloridized, and especially not amalgamated, and also not successfully leached. I am inclined to believe that the analysis, as given here, does not represent the character of the ore which was treated on a large scale. The carbonate of lime in roasting is partly converted into sulphate of lime and partly into caustic lime, and caustic lime has a tendency to decompose chloride of silver and form metallic silver. Caustic lime, as well as other alkalis, has an injurious effect in leaching and in amalgamating.

I further remark that this analysis figures up exactly one hundred, and the silver is left out entirely. This is characteristic of Professor Price's analytical work (of which I had occasion frequently to see samples), that it always figures up exactly one hundred. And I suppose it is necessary in the West, because people would not be satisfied if the total per cent was not exactly one hundred.

In making a chlorination test of the samples, I see that Mr. Clemes uses a boiling concentrated solution of hyposulphite of soda. These chlorination tests are generally made with a cold solution, or at least with a moderately warm solution. It is also generally assumed that, in subjecting a sample of roasted ore to a chlorination test, only the chloride of silver is dissolved. This is not exactly true, especially if a warm solution of sodium hyposulphite is used, a great deal of silver is dissolved which is present in the metallic state. Mr. Russell, assayer at the Ontario mill for some time past, has investigated a great many chemical reactions of the leaching process, and has made especial experiments in regard to the solubility of different silver compounds in the hyposulphite solution. He finds that while a cold solution—say a solution at 15° Celsius—dissolves a comparatively small amount of metallic silver, a solution which is heated to 75° or 50° dissolves more than three times as much; so that, where we use a hot solution in the chlorination test, we not only get into solution the chloride of silver, but also metallic silver. And, furthermore, Mr. Russell found that also silver arsenate and antimonate are soluble in the hyposulphite solution, showing that really in all these tests it is not correct to speak of a chlorination test, but that it ought to be called a lixivation test. I have no doubt that, in roasting this ore, a great deal of metallic silver was really formed by the lime and went into solution in the leaching process. But, at the same time, I repeat that it seems to me doubtful that these results could have been obtained if the whole lot of ore treated contained over thirty-three per cent of carbonate of lime.

Dr. T. Eggleston, New York: I have read this paper with some interest, mostly because at present leaching appears to be the only

Process Applicable in the Case of Poor Ores.

Especially in those containing the base metals. So far as my own personal experience goes, these conditions are applicable to almost any low-grade ore, unless it contains a very large amount of lead, and so applicable to a large class of ores that cannot be treated in any other way.

I wish particularly to speak of the great tendency there is in the West to use too much salt. Too much salt, or more salt than is required, is a disadvantage. First, because its use increases the cost; and, secondly, it is a positive disadvantage in the lixivation. A very ingenious process has been invented by Mr. Hoffmann, of washing with hot water from the under side. By thus introducing the hot water from the bottom all the excess of salt is carried up, dissolving the silver as it goes. Then coming in contact with a great excess of water, the silver is precipitated on the top, and is left there as a crust, which contains almost all the silver which was dissolved.

I notice in this paper that the leaching was done from the top, and consequently all the extra salt went to dissolve out the silver, which must be precipitated from the leaching liquors. The bottom washing is a very ingenious contrivance to prevent this, to which special attention needs to be called. Where an excess of salt is used, and the leaching is not done from the bottom, and the washing water comes down through the ore, a considerable quantity of silver is found with the base metals precipitated. Where it is done from the bottom the silver is precipitated toward the top of the vat. A bullion which is comparatively pure is produced, as well as base metals from pure silver.

I would like to ask Mr. Steefeldt with regard to the results from his chloridizing furnaces. My own experience is with revolving furnaces that are eight feet long.

Mr. Steefeldt: The experiments which have been carried out lately by Mr. Russell

At the Ontario Mill

Give on an average from 93 to 94 per cent of the silver extracted by lixivation with Russell's solution, while the average by the ordinary

hyposulphite solution is only about 90 to 91 per cent. Some very curious experiments have been made in roasting Ontario ore in the Steefeldt furnace without any salt. The feeding of salt, which is crushed separately, was completely suspended, and the furnace was run for three hours without salt. After discharging the ore it was left for twelve hours on the cooling floor. About 89.7 per cent of the silver was lixivated from this ore by Russell's process, a part of which, namely, 17 per cent, was present as sulphate of silver, which would be extracted by water. Then about four or five per cent was present as native silver, and the rest as antimonate and arsenate of silver. From fahl-ore, which forms the principal silver-bearing mineral of the Ontario ore, and contains both antimony and arsenic, the last-named combination resulted. The way that this experiment on a large scale came to be made was this: I asked Mr. Russell to roast different ores in the muffle (oxidizing) and then try the effect of his new solution. About the composition of the latter I can say nothing here, because Mr. Russell's patents have not yet been granted. He took samples from the Ontario mine, from the Manhattan mines, from the Lexington mine, and from several others, and roasted about a pound of each in the muffle. The roasting was continued for half an hour, one hour, one hour and a half, two hours, two hours and a half, and three hours. A most remarkable fact was established in leaching these roasted samples, namely, the longer the roasting continued the less silver could be leached out. For instance, after half an hour he leached out thirty-one per cent, and after three hours he leached out only eight per cent. In another case, after half an hour he leached out sixty per cent, and after three hours only about five.

It appeared, from these tests, that the results were principally a function of time consumed in roasting. Hence the experiment on a large scale in the Steefeldt furnace was carried out.

Mr. Russell made this experiment in the Steefeldt furnace at a very high temperature, and I have advised him to repeat it at a moderate temperature. The muffle-experiments were also carried out in two ways, one series of experiments at a low red heat, and another at a cherry-red heat; and in every instance the high temperature had an injurious effect upon the extraction of the silver, and a low temperature had a beneficial effect. I have no doubt that, by roasting at a moderate temperature he will be able to extract 93 or 94 per cent of the silver.

Dr. Eggleston: There is another very curious thing about

Roasting With Salt.

In most ores the less salt that is used the better. There is a great gain in using a minimum amount of salt, and then leaving the material on the cooling-floor, as it has been found that chlorination continues in the heap long after it has left the furnace.

Mr. H. M. Howe, Boston: In oxidizing, as well as in chloridizing, roasting the decomposition of sulphurets goes on after they have been withdrawn from the furnace, and if they are heaped together, so as to keep hot, we find that after the lapse of a few hours the amount of undecomposed sulphurets has materially decreased. This is, no doubt, due to the reaction of sulphates, and even of oxides, present in the sulphur of the undecomposed sulphides yielding sulphurous acid and a low oxide of the metal; the sulphuric acid, and the previously formed oxides, which thus react on the sulphurets being reduced to a lower state of oxidation.

In some oxidizing roasts in an open reverberatory, on previously kiln-burnt Spanish pyrites, I found that the amount of copper existing as undecomposed sulphurets was diminished by 0.7 per cent while the ore was cooling in a heap outside of the furnace, the total copper contents being only about eight per cent. On this account it is very desirable to have pockets under or beside the furnace, where the ore can be kept hot for a long time after drawing.

Mr. Steefeldt: As far as the use of salt is concerned, that is exceedingly different with different classes of ores. I have succeeded in roasting ore with about two and a half per cent of salt, but with most ores such a low percentage is entirely insufficient. For instance, we have carried out a series of experiments at Ontario to determine the percentage of salt necessary. Five per cent of salt has no effect whatever. It is simply consumed without chloridizing the silver. Good chlorination only commences with ten per cent of salt, and chlorinations in the nineties cannot be obtained with less than sixteen per cent and more. Since at the Ontario mill salt costs only eight dollars per ton, one per cent of salt forms no item, and it has been found of advantage to use a surplus of salt.

Dr. Eggleston: I believe that in most cases, if the salt was reduced to 50 per cent, there would be a gain of 15 to 20 per cent in the chlorination.

Mr. Steefeldt: As far as the loss of silver is concerned in the leaching process, caused by the wash-water, that loss will vary according to the quantity of undecomposed salt in the ore, and whether hot or cold water is used. In Russell's experiments with Ontario ore, about three-fourths of one ounce of silver per ton of ore was lost in the wash-water. A large portion of this silver was regained by treating the first wash-water, containing also copper, with scrap-iron.

Cement-copper was precipitated with about 200 ounces of silver per ton.

Dr. Eggleston: Leaching from the bottom?
Mr. Steefeldt: From the top.

Production and Value of Nickel.

Price.

The price of metallic nickel in the market has been subject to considerable fluctuations, depending upon the variable demand and supply. The metal is to be viewed as a new material, a new gift to the industrial arts, with an unknown number of applications before it. The discovery of the cheap and effective methods of depositing nickel from solution by electricity, at once created a new outlet for a large quantity annually—a quantity which like the silver used in electro-plating is forever lost to the arts, not being capable of being economically regained, as is usually the case with alloys and objects made of solid metals. The demands for coinage also have not only been large, but have been sudden and transient, and have been the chief distributors of the average market price of the metal. The production of nickel has always been comparatively limited, in as much as the consumption has been uncertain and not firmly established by a long continued use of the metal in the arts.

Although the localities are numerous and wide-spread, the ores are not very rich and abundant, and it appears certain that the production of this metal will always require tedious, expensive processes, such as to make the item of labor an important one in the costs of production. This will always give the metal a high value, as compared with iron or copper, and makes it on this account, as on others, well adapted to use as money, it being so largely a representative of labor performed.

According to Wharton, the extremes in the price of nickel in England, since the metal attained commercial importance up to about the year 1877, were from 4s. to 16s. per pound—say \$1 to \$4 per pound. The former rarely touched, and the latter but once for a short time in 1873. In the year 1861 nickel was quoted at from \$1 15 to \$1 20 per pound. In 1864 it was quoted at 8s. in England, and in 1867 in France at 1,500 to 1,700 francs per 100 kilogrammes, or 7½ to 8½ francs per pound. The price in England, in 1883, was quoted in a memorial to Congress at the equivalent of 70 cents per pound.

Mr. J. M. Merrick, in his excellent article upon nickel in Johnston's Cyclopaedia, gives a tabular statement showing the range of price of nickel per pound in large lots for a series of years from 1870 to 1876, as follows:

Price of Nickel from 1870 to 1876.

Years.	Prices.
1870.....	2 00 to \$1 20 currency.
1871.....	1 50 to 1 00 currency.
1872.....	2 25 to 1 20 to 1 00 currency.
1873.....	3 25 to 1 10 currency.
1874.....	2 80 to 1 10 currency.
1875.....	3 00 to 1 10 currency.

The following figures give, in continuation of the preceding, the average market price of nickel in the United States from 1875 to January 1, 1883, a period of seven years:

Price of Nickel from 1876 to 1883.

Years.	Prices.
1876.....	\$2 00 gold.
1877.....	2 00 to \$1 20 currency.
1878.....	1 20 to 1 00 currency.
1879.....	1 15 to 1 10 currency.
1880.....	1 10 currency.
1881.....	1 10 currency.
1882.....	1 10 currency.
1883.....	1 10 currency.

The market price at the end of the year 1882 was \$1 10 per pound, and in May, 1883, about \$1 per pound, wholesale. Reductions or discounts are made by foreign makers to their large customers in the United States, the amount of which in each case is not known.

The extreme prices in the United States for ten years prior to 1877 were, according to Mr. Wharton, about \$1 40 and \$2 80 gold for large contracts. The nickel then made contained about five per cent more impurities than the best since made, which contains 98 per cent or over of pure nickel.

In the years 1874, 1875 and 1876 the German government paid an average price of about 10s. 6d.—say \$2 62 gold per pound for the nickel in the planchets for coining. The extraordinary demand for the metal from this source carried the price for a time abnormally high, to \$3 50 per pound. During that period the German government consumed in coinage over 800,000 pounds of nickel (380,748 kilogrammes up to January 6, 1877, not including waste), purchased as planchets ready for stamping. The relative value of nickel and silver, taking 54d. per ounce for standard silver, or 58½d. for fine, and 5s. per pound for nickel, is as 1 to 14.18.

Production in the United States.

Before the year 1864 the whole amount of pure nickel made in the United States was not over 100,000 pounds avoirdupois. Since then, to May, 1867, the Camden works turned out 105,000 pounds, and they were at that time producing at the rate of 105,000 annually.

The total production of nickel from the Gap mine to the end of the year 1882 is estimated at 4,000,000 pounds. It is not now being worked, having been shut down since January, 1883, and there is now, therefore, no production to record for the first portion of the year 1883.

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The production of pure grain metallic nickel in the United States for seven years past, from 1876 to 1882 inclusive, aggregates 1,466,765 pounds, an annual average of 209,538 pounds, as shown in the following table:

Annual Production of Nickel in the United States since 1876 (pure grain nickel.)

Years.	Pounds.
1876.....	201,367
1877.....	188,211
1878.....	150,590
1879.....	145,120
1880.....	233,893
1881.....	265,068
1882, nickel.....	277,034
50 per cent. alloy, nickel therein.....	4,682

Total for seven years.....1,466,765

The consumption of nickel in this country for the first six months of 1883 is hard to give with accuracy, but it may be estimated at not less than 150,000 pounds.

Production in Europe.

The annual production of nickel in Europe in 1873 was estimated by Messrs. Maw and Dredge, the reporters on the metallurgical exhibits at the Vienna Exhibition, to be but about 500,000 pounds, and in America 200,000 pounds. The greatest producers of nickel in Germany at that time were the Saxony Cobalt Company, at Oberschlema and Pfannenstiel, near Schneeberg, in the Saxon Erzgebirge, which turned out over 10,000 pounds of pure metal.

The production of nickel ores and spies in the principal countries at the time of the International Exhibition in Paris, 1867, was, as nearly as could be ascertained from the official reports, as follows:

England (ores).....	Tons.
Austria (ores).....	1,745
Prussia (ores).....	600
Nassau (spies).....	250
Saxony (spies).....	52
Italy (spies).....	15
United States (ores).....	7
Sweden and Norway (spies).....	2,350
	150

The total annual product of metallic nickel in all countries was estimated in 1877 to be about 1,200,000 pounds or 550,000 kilos. Mr. Wharton's establishment at Canby then supplied about 260,000 pounds, or one-sixth of the entire product.

Recent Contributions to the California State Mining Bureau.

(Furnished for publication in the MINING AND SCIENTIFIC PRESS BY HENRY G. HANKS, State Mineralogist.)

[CATALOGUE.]

- 5276. Encino (Live Oak)—Honduras wood. M. A. Soto.
- 5277. Nance—Honduras wood. M. A. Soto.
- 5278. Tegajale—Honduras wood. M. A. Soto.
- 5279. Roble Blanco (White Oak)—Honduras wood. M. A. Soto.
- 5280. Gualabillo—Honduras wood. M. A. Soto.
- 5281. Alazan—Honduras wood. M. A. Soto.
- 5282. Cacha de Concepcion—Honduras wood. M. A. Soto.
- 5283. Refined Borax—Refined by the Harmony Borax Company, in Alameda Co., Cal. Presented by the company.
- 5284. Kaolin—Sections 4 and 5, township 16 north, range 8 east, Nevada Co., Cal. Millen Ford.
- 5285. Kaolin—Baked in potter's oven, by Gladding & McBean, and pronounced by them to be a good white burning clay, or kaolin. From the deposit No. 5284, Nevada Co., Cal.
- 5286. Refined Borax—Manufactured by the San Bernardino Borax Mining Co. (See No. 5379).
- 5287. Rock Specimen—Hanging wall, Nevada City mine, 600-foot level. (See No. 4853). The mine is situated one mile and a half from Nevada City, Nevada Co., Cal. E. P. Heald.
- 5288. Rock Specimen—Foot wall of the Nevada City mine, one and a half miles from Nevada City, Nevada Co., Cal. (See No. 5287). E. P. Heald.
- 5289. Sulphurets Ore, with visible free gold—Nevada City mine, one and a half miles from Nevada City, Nevada Co., Cal. (See No. 4853). E. P. Heald.
- 5290. Refined Borax, from Peck's Marsh, Esmeralda Co., Nev. Smith Brothers.
- 5291. Borate of Lime (Ulexite)—Desert Springs Lake, Kern Co., Cal. Boracic Acid Manufacturing Co., J. B. Hobson, Superintendent.
- 5292. Borate of Lime (Sheet Cotton)—Desert Springs Lake, Kern Co., Cal. J. B. Hobson.
- 5293. Boracic Acid (98.8 per cent)—Boracic Acid Manufacturing Co., J. B. Hobson, Superintendent. (See No. 5291).
- 5294. Iron Ore—Found in large quantities at Tepache, 10 miles from Culiacan, Sinaloa, Mexico, with an abundance of water and water. James D. Schuyler.
- 5295. Tooth of a Horse—Found on a creek that empties into the river, Humboldt Co., Cal., in a soft stone which seems to be siliceous. It is probably fossil. The remains of fossil horses have been found in abundance in Oregon. R. E. Herick.
- 5296. Limonite Crystals, after Pyrite (containing gold)—Butte Co., Cal. Mrs. Charles Slocum.
- 5297. Borate of Lime (Sheet Cotton)—From which boracic acid is made. (See No. 5291). From Desert Springs Lake, Kern Co., Cal. (Described folios 29 and 81, Part II, Third Annual Report of the State Mineralogist. Presented by the Boracic Acid Manufacturing Company, J. B. Hobson, Superintendent.
- 5298. Crude Borate of Lime—Variety known as Sheet Cotton (described folio 83, Part II, Third Annual Report of the State Mineralogist). From Desert Springs, Kern Co., Cal., and presented by Boracic Acid Manufacturing Co., J. B. Hobson, Superintendent.
- 5299. Ammonite—Found in the mountains, Placer Co., Cal. John Hensley. (See letter on file.)
- 5300. Agalutinites (?)—Some what resembling the Chinese Figure Stone, and similar to a rock from San Luis Obispo. (No. 4994). This beautiful ornamental stone is found two miles west of Greenwood, Eldorado Co., Cal., in a vein from six inches to a foot in thickness. Alex. Keller.
- 5301. Yellow Ochre, of good color and quality—Found in large quantity on section 32, township 12 north, and range 11 east, four miles east of Georgetown, El Dorado Co., Cal. E. H. Watson.
- 5302. Silver-Gold Ore—340-foot level, Oro mine, Bodie, Mono Co., Cal. T. Steel.
- 5303. Silver-Gold Ore—440-foot level, Oro mine, Bodie, Mono Co., Cal. T. Steel.
- 5304. Silver-Gold Ore—520-foot level, Oro mine, Bodie, Mono Co., Cal. T. Steel.
- 5305. Silver-Gold Ore—750-foot level, Oro mine, Bodie, Mono Co., Cal. T. Steel.
- 5306. Horns of the Mountain Sheep—Ovis Montana (Cuv.) called, also, Big Horn—Wild Rose District, Telescope Range, Inyo Co., Cal. Capt. J. M. Keeler.
- 5307. Models of Mining Tools—Made and presented by F. O. Shuter.
- 5308. Models of Mining Tools—Presented by Isaac Blum, one, Jr.

PHILADELPHIA MANUFACTURING INDUSTRIES: There were built in Philadelphia in 1883, no less than eighty-three factory buildings and eighty foundries and machine shops, and this notwithstanding the general depression of manufacturing industries throughout the country.

Prospective Boom.

The *Cœur d'Alene* are not destined to monopolize the mining excitement this year, if whispered rumors are to be credited. The air is filled with mysterious suggestions of other fields which are plethoric with gold. Whether these rumors will culminate in anything tangible is far more uncertain than the prospects in our hill diggings or the chances for mammoth quartz mills at a dozen points on Pritchard and Eagle. But it is well to be posted regarding rumors, and we give them as they come, leaving our readers to draw their own conclusions. The first and best authenticated story is that rich gold-bearing placer and quartz ledges have been discovered about fifty miles to the south-east, on the St. Joseph river. This rumor bears the stamp of truth, as the formation is similar to that of the *Cœur d'Alene* region, and there seems no good reason to doubt the existence of valuable mines in that section as well as this. Should developments justify, the rush will doubtless extend to the St. Joseph country.

Rumor number two is located far to the northward, in the Kootenai country, between the Northern Pacific and the British possessions, and extending across the line. This country is known to be in the mineral belt, and may prove rich in precious metals. It is possible the Northern Pacific may wish to extend a branch in this direction, and that may have something to do with the whispers that are being circulated.

Number three is in the direction of the Flat-head reservation, eastward from here, and farther away. This is perhaps the vaguest of the rumors, but may not be entitled to the least credence.

The fourth comes from Snake river, and has as yet assumed no tangible form. Certain it is that the coming summer will witness a thorough prospecting of northern Idaho and Montana. Eagle will be the radiating point, and, so far as heard from, will form the center and nucleus of the new discoveries. All is for us that is not against us, and we shall be glad to learn that rich fields exist in every direction. Every gulch and hillside, every flat and mountain, will be searched over and over before the year closes, and it will be strange indeed if much pay dirt and many a good ledge is not brought to light. It has for years been an open secret that good prospects could be found throughout a vast track of country of which the *Cœur d'Alene* forms a part. There is ample room for prospectors, and many a grub stake will be furnished to those who are willing to endure the hardships and explore the mountains. "Unprospected" could be printed on the greater portion of the map of this entire country. Prospectors are too eager to wait for the snow to go off, and even now are scattered far and wide through the hills. As soon as the snow disappears the search will be general and very thorough. It took nerve and perseverance for Pritchard and Gilatt to make their discoveries, but now that the glitter of gold has caught the prospector's eye, nothing can prevent every nook and corner of all this vast country from being carefully worked.—*Cœur d'Alene Nugget*.

Mill City Reduction Works.

One of the Best Quartz Mills in the State.

R. L. Fulton took a look at the new reduction works at Mill City and gives the result of his observation in the *Gazette*. He says: Humboldt county has not had as good a prospect for years as it has to-day. There are many mines that look well, and the facilities for working them are increasing all the time. The Mill City Reduction Works will be completed in a few days, and by May 1st will be working ores. Any kind of rock can be handled as they have stamps and furnaces both. The ore first strikes a Blake improved crusher, that can handle $4\frac{1}{2}$ tons an hour. A belt and bucket elevator carries the ore to a bin high enough to be led through pipes, either to the dry kiln or the battery. The latter crushes it coarsely, but fast. It has five stamps and very coarse screens. From it the ore goes to a set of Krom rolls, that make 100 revolutions a minute and crush 25 to 30 tons a day, so that it goes through a 40-mesh screen. The rolls are of 16-inch face, 26 inches in diameter, and, with the frame, weigh seven tons. Mr. O'Donnell has introduced an improvement in them that adds to their power. They are new to this section, only being used at Mt. Cory and a mill near Eureka. There are four pans and two settlers below the rolls. If the ore is roasted it goes from the rolls through another elevator to a belt and screen, which throws it into the O'Hara furnace, where 30 tons a day can be handled. It is 50 feet long, and has two plows to turn the ore on the bed. Each plow moves it forward three-fourths of an inch. These plows can be regulated so that the ore can lie in the furnace any time from six to 22 hours. The ore falls into pits and is pulled out into the cooling floor. The power is supplied by a fine steam engine. The boiler will burn sagebrush and the furnace cedar and pine. The iron foundry is to be moved to the east side of the mill, and far enough away to be out of danger of firing the mill. The works are owned by James Gould and James O'Donnell, who are doing most of their work themselves. They can work ore very cheap, and anything that has \$30 in it can be made to pay. They will work ore in 1,000-ton lots for \$15 a ton.

USEFUL INFORMATION.

Uneven Shrinking.

Much loss is occasioned in the foundry by uneven shrinking of castings, causing distortions and fractures. Some of these may be avoided by previous preparation in the construction of the patterns. Rimmed wheels with arms, like pulleys and gears, are particularly liable to these shrinkage losses. This is because the continuous rim and the solid hub retain their heat longer than the separated and comparatively light arms. The remedy that suggests itself is to make these arms longer, so as to allow them more shrinkage. Obviously the only way to lengthen the arms is to make them dishing, instead of having them run on a straight line from rim, through the hub, to rim, deflect them out of a right line, having the result of making a dished wheel, the hub being out of line with the edges of the rim, and the arms on a corresponding slant. The amount of this "dish" or drop of the hub should be about that of the estimated shrinkage of cast iron—one-eighth of an inch to the foot. Thus, a pulley of twelve inches diameter and six inches face should be dishd by the pattern-maker so that the hub drops about one-eighth of an inch below the level of the pulley rim edge.

Pulleys and gears cast with these dished arms come straight on cooling, and they do not require to be uncovered, or partially uncovered, in the mould to facilitate even shrinkage. Every machinist knows what annoyance he has suffered from the chilling of cored hub holes and of the rims of pulleys, the core hole in the hub being sometimes swabbed while red hot, and the sand from the rim dug away, making much trouble in boring, and necessitating the grinding of a pulley face instead of turning it.—*Scientific American*.

SOFTENING WATER.—An account is given in the *Engineer* of a method of softening water followed in some industrial establishments in Germany. The principle of the process is based upon the fact that heated and hydrated oxide of magnesia readily absorbs the free carbonic acid of natural water; and by thus depriving the water of its dissolved gas, precipitates the carbonate of lime previously held in solution. The magnesia then dissolves, and unites with the bicarbonate of magnesia in the water. At first, water thus softened was suspected of attacking old boilers fed with it, and filling them with mud. It was afterwards found, however, that it was the old hard scale that had been dissolved into mud; thus exposing any weak places and leaks that might have been corroded over before the purified water was introduced. The water thus treated has an alkaline reaction, and counteracts any possible acid corrosion. At first, stirring was considered an indispensable part of the process; but, eventually, it was found that straining the water, through an excess of the hydrated oxide of magnesia spread on a filtering medium, would produce the desired effect without further trouble. By mixing proportionate quantities of finely powdered oxide of magnesia and saw-dust with water, and subsequent heating, hydrated oxide of magnesia will be formed throughout the whole mass. This preparation forms a most valuable filtering material. Metal cylinders are tightly filled with the mixture and used as filters; and they are efficient, not only in cleaning dirty water, but also in softening it, for the carbonate of lime crystallizes directly upon the sawdust.

PREPARING NUTS FOR THE TABLE.—A correspondent of the *Herald of Health* writes that journal as follows: I have just discovered that soaking the smaller kinds in fresh water for three or more days, as required, gives them a freshness otherwise unattainable. There is a nut rather plentiful at the present time, at various fruiterers, called by several names, such as "Turkish filberts," etc. It is a long nut and filbert-shaped, in color of shell resembling Spanish or Barcelona nuts. I bought some already soaked, which were the nearest approach to fresh filberts I have tasted. My fruiterer tells me that old Brazils, if good, may be treated the same (but need longer soaking). I am experimenting. Nuts must be well masticated, or will prove indigestible.

GEMS FROM BLAST FURNACES.—Gems from refined blast furnace slag are on exhibition in a Wall street jewelry store in New York. These cut and set stones have the hardness of natural silicates and the brilliancy of the much softer lead-glass, or "strass," of which the so-called "Parisian Diamonds" are made. What their value as artificial gems may be is of less importance than the fact that they are made of American blast furnace slag, the raw material being the usual cinder of foundry and Bessemer pig iron from anthracite furnaces in New York and New Jersey.

THE NEW GLASS invented in Vienna seems to have proved a success in the qualities claimed for it—that is, it is transparent and more brilliant than common crystal, can be cut and polished, and when fused, adheres to iron, bronze and zinc. Singularly enough, the glass differs from all others, new or old, in that its composition includes none of the usual ingredients—silica, potash, soda, lime or borax.

A **USEFUL INSTRUMENT**, which will doubtless become a necessity in certain lines of manufac-

turing, is being introduced in England. An electric system is established throughout a factory, which, through the agency of an indicator placed in the office, shows at a glance whether the different looms or machines in the building are in operation.

TO MEND RUBBER CLOTH. Any one who has had the misfortune to injure the coating of a rubber umbrella will be glad to know that it is not without remedy. A preparation of damar varnish and asphaltum in about equal quantities, with a little turpentine, will make an easily applied coating, which makes the umbrella about as good as new again. Spots on gossamer coats and cloaks can be covered with this also.

THE "SETTING OF GYPSUM" is the result of two distinct phenomena. On the one hand, portions of anhydrous calcium sulphate, when moistened with water, dissolve as they are hydrated, forming a supersaturated solution. Again, this same solution deposits crystals of the hydrated sulphate, gradually augmented in bulk, and unite together.

BUMPING CARS.—When riding in a railway car that bumps along like a country wagon over a corduroy road, you may infer that the wheels are not as round as they ought to be. Putting the wheels of a hard-riding car in a wheel-grinding lathe and truing them, will be found a very effective method of giving passengers a smooth, pleasant ride.

LUBRICANT FOR HEAVY BEARINGS.—The following is said to be a good lubricant for heavy bearings: Dissolve the best of white lead in good machine oil, make it pretty thick, take all the hard and clotty substance away, then add the remainder, and you will find a good lubricant.

WATER-PROOF VARNISH FOR IRON.—A varnish compound of 120 parts of mercury, ten parts tin, twenty parts green vitriol, 120 parts water and 15 parts hydrochloric acid of 1.2 specific gravity, furnishes a good coating for iron exposed to the wet.

CHEAP FIRE-PROOF ROOF.—A German paper says that a roof can be made fire-proof by covering it with a mixture of lime, salt and wood ashes, adding a little lamp black to give a dark color. This not only guards against fire, it is claimed, but also in a measure prevents decay.

THE substitution of hemp rope for pelting is becoming common in England. Large grooved pulleys and rope two to two and a quarter inches in diameter are used. There is said to be a vast difference in cost in favor of rope.

THE FIRST CARTRIDGES were made in China fifteen hundred years before the dawn of the Christian era. They were used at great festivals simply in pyrotechnic displays, and of course were all "blanks."

GOOD HEALTH.

Exercise as a Remedy for the Nervous.

Dr. Oswald writes in *Popular Science Monthly*: "When I reflect on the immunity of hard-working people from the effects of wrong and over-feeding," says Dr. Boerhaave, "I cannot help thinking that most of our fashionable diseases might be cured mechanically instead of chemically, by climbing a bitter wood tree, or chopping it down, if you like, rather than swallowing a decoction of its disgusting leaves." For male patients, gardening, in all its branches, is about as fashionable as the said diseases, and no liberal man would shrink from the expense of a hoard fence, if it would induce his drug-poisoned wife to try her hand at turf-spading, or at hoeing, or even a bit of wheelbarrow work. Lawn tennis will not answer the occasion. There is no need of going to extremes and exhausting the little remaining strength of the patient, but without a certain amount of fatigue the specific fails to operate, and experience will show that labor with a practical purpose—gardening, boat-rowing, or amateur carpentering—enables people to beguile themselves into a far greater amount of hard work than the drill-master of a gymnasium could get them to undergo. Beside the potential energy that turns hardships into play-work, athletics have the further advantage of a greater disease-resisting capacity. Their constitution does not yield to every trifling accident; their nerves can stand the wear and tear of ordinary excitements; a little change in the weather does not disturb their sleep; they can digest more than other people. Any kind of exercise that tends to strengthen—not a special set of muscles, but the system in general—has a proportionate influence on the general vigor of the nervous organism, and thereby on its pathological power of resistance.

For nervous children my first prescription would be—the open woods and a merry playmate; for the chlorotic affections of their elder comrades—some diverting, but without fatiguing, form of manual labor. In the minds of too many parents there is a vague notion that rough work brutalizes the character. The truth is, that it regulates its defects; it calms the temper, it affords an outlet to things that would otherwise vent themselves in fretfulness and ugly passions. More school teachers know that city children are most fidgety, more irritable and mischievous than their village comrades; and the most placid females of the genus homo are

found among the well fed but hard-working housewives of German Pennsylvania.

AN AID TO CURING ALCOHOLISM.—A contemporary writes: We believe the best authorities are generally skeptical as to there being any sure cure for confirmed habits of inebriety unless the effort in that direction be aided by a strong exercise of the will of the unfortunate subject of the bad habit. There are, however, many remedies recommended as aids in diverting or in a minor degree satisfying the appetite for strong liquors, which are undoubtedly of great advantage in some cases, and one of these is thus recommended by a self-styled "rescued man": "I was one of those unfortunates given to strong drink. When I left it off I felt a horrid want of something I must have or go distracted. I could neither eat, work, nor sleep. Explaining my affliction to a man of much education and experience, he advised me to make a decoction of ground quassia, a half ounce steeped in a pint of vinegar, and to put about a small teaspoonful of it in a little water, and to drink it down every time the liquor thirst came on me violent. I found it satisfied the cravings, and it sufficed a feeling of stimulus and strength. I continued this cure, and persevered till the thirst was conquered. For two years I have not tasted liquor, and I have no desire for it. Lately, to try my strength, I have handled and smelted whisky, but I have no temptation to take it. I give this for the consideration of the unfortunate, several of whom I know have recovered by means which I no longer require."

A BLIND MAN ON THE CARE OF THE BLIND. At a recent entertainment given in London to 200 blind persons, Postmaster-General Fawcett, who is himself totally blind, remarked: "Within the last few years I believe there has been remarkable improvement in the methods adopted in many of the institutions for educating the blind. To take one example—and others might be selected—I believe that of the pupils who leave the Normal College for the Blind at Norwood, about 80 per cent maintain themselves in after life. With regard to those who become blind when they are adults, very different considerations apply. I believe it is found that the fingers very soon lose that marvelous dexterity of touch which many of the young blind possess, and that, consequently, the adult blind cannot be trained in the same manner. With regard to those who become blind in after life, the one thing which, above all others I wish to enforce, is, do not take them away from the joys and pleasures of home life, do not keep them within the walls of institutions, do not congregate them together, but let them live, as far as possible, with those who can see."

COOLNESS AND FEAR IN WOMEN.—A writer describes in one of our daily papers a scene at a hotel in Saratoga during a fire, with the coolness and self-possession of some of the women, and the fright of others. He made some inquiries as to the character and training of both classes, and found that those who were self-possessed were the business women and those who had received physical culture, while the frightened ones were the daughters of wealth, luxury and idleness. It is certain, however, that not all the daughters of wealth are timid, nor all those who work brave. It is partly a matter of education and training and partly a matter of birth and inheritance. Such hasty conclusions from hurried observations would not count for much in a careful study of such a question.

CONTAGIOUS BALDNESS.—A German physician contends that premature baldness is usually a result of contagion. He claims that the hair is destroyed by a fungus which is communicated from one head to another by means of combs and hair-brushes. The remedy recommended is washing the scalp daily with tar soap, afterward bathing it with warm water for some time, and then drying the hair and applying a weak solution of carbolic acid. A one or two per cent solution is of sufficient strength. The wash should be continued six or eight weeks, and is said to be successfully employed when the hair first begins to fall out.

ALCOHOL AND DIGESTION.—We see many preparations of which the chief virtue is supposed to be that they contain *all* the digestive principles. These can be active only so far as they contain pepsin, and have no advantage over the simple drug. It has also been shown that certain substances combined with pepsin in solution render it inert. Alcohol is one, and even in moderation diminishes its action, while, in any quantity, the activity of pepsin is totally prevented. This is a point often lost sight of, and serves as a hint concerning the use of liquors at meals, by dyspeptics.—*Med. Rep.*

HALF THE SEX INVALIDS.—Our dainty notions have made women such a hot-house plant, that one-half the sex are invalids. The mothers of the next generation are invalids. Better that our women, like the German and Italian girls, should labor on the highway, and share in the toil of harvest, than pine and sicken in the indoor and sedentary routine to which our superstition condemns them. But I leave this sad topic for other hands.—*Wendell Phillips*.

IVY POISONING.—In cases of poisoning with poison-ivy, paint the affected parts as soon as possible with a mixture of quick-lime and water. The mixture should stand half an hour after the lime and water are put together.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

DOWNS.—Amador Ledger, April 19: Prospecting is the work in hand at the mine near Volcano. The ore-body in the upper level of a paying quality has been pretty well exhausted, and it is now necessary to prospect at greater depth. Confidence is felt, however, that the researches will be crowned with further important developments.

MISCELLANEOUS.—The weekly cleanup at the St. Julian mill last Sunday was satisfactory, although not so productive as previous runs. The big tunnel at Middle Bar was partially flooded last week by a break in the ditch, causing the water to pour down a small gulch and over the mouth of the tunnel. The workmen inside were apprised of the mishap by the water backing up and covering the floor of the tunnel to a considerable distance. The building in which the air compressor and blacksmith shop are located was made the repository of a lot of debris, but no serious harm was done, and the works were soon placed in running order again. A water blast has been placed in the tunnel to drive the smoke from the head. This is merely a temporary expedient until a first class blower arrives. The head of the tunnel is in hard granite, distance nearly 800 ft from the mouth.

El Dorado.

PROSPECTING.—Placer Herald, April 16: A. H. Dake, who is an old resident of Auburn and an experienced miner, has been employed by a rich and influential company to prospect the country in the neighborhood of Greenwood, El Dorado county. He has returned to Auburn after an absence of one month. During his absence he has passed over a great tract of country in the vicinity of Greenwood, and has ascertained, as far as could be done in so short a time with limited facilities, the mineral condition of the country, and has satisfied himself that the mineral wealth of that district is very abundant, and if the company he represents meets with the necessary encouragement, they will immediately take such measures as are necessary to fully develop the mineral resources of that portion of the State. Like all other mining localities, there are a number of individuals who own claims that are entirely undeveloped, and want to sell them at exorbitant prices, which, if persisted in, will prevent the company Mr. Dake represents from opening up the mineral resources of that district, which, he is satisfied, would make Greenwood a very lively mining camp and add greatly to the prosperity of the town.

SLATE MOUNTAIN.—Cor. Mountain Democrat, April 11: All our people are manifesting an interest in the famous Slate Mountain mine. This mine is under the superintendency of D. Monchton, and having been thoroughly tested, promises to be a "bonanza" in earnest. They have expended much capital in grading a road and erecting a bridge over Rock creek. They intend, within forty days, to have a mill erected.

Modoc.

ORE.—Cor. Adin Argus, April 12: A vein of good paying ore is reported to have been struck in the "Gopher." This claim lies in the flat south of the Hill, and formerly belonged to Stearns & Driskell. Frisby Hoes has about 300 tons of ore on his dump. It is not of as high a grade as that formerly worked from the mine. He is now, however, working at a greater depth and extracting a better quality of ore. Mr. Hoes expects to have his new mill ready to run by the 15th prox. The Lewis & Harbert, Juniper and Golden Eagle are working with about the same degree of success as when last reported. The Blue Bell Co. have good pay in sight.

Mono.

TRAMWAY.—Homer Mining Index, April 19: Both of the Bodie papers give currency to a report that a tramway is to be built from the same point near the old toll house on the Lake Canyon road to the May Lundy mill, to facilitate the transportation of ore. With the additional five stamps that are to be put into the mill at once, the extension of the lower tunnel of the May Lundy into Lucky Morton ground, and the starting of additional stopes therefrom, and the opening of the Lake View—all of which projects enter into the calculation for the coming summer's work—such a structure as the proposed tramway would become a necessity, besides greatly reducing the time and cost of transportation. It is stated on the best of authority that the Gorilla Mill and Mining Company has already purchased (or had made to order) in San Francisco a new mill, and that it will be shipped here just as soon as the roads become passable. The mine is being put in order for vigorous operations, and as the legal obstacles to obtaining a patent are rapidly vanishing, the company now seems to be on the high road to prosperity. The new mill is to be put up at the foot of the tramway, so that the ore can be run right from the mine to the batteries by car.

Nevada.

QUARTZ MINING ON THE RIDGE.—Nevada Transcript, April 14: W. L. Thurston came down from the San Juan ridge Saturday to get supplies. He says that prospecting for quartz is being actively pursued in the vicinity of Cherokee. The claim of Thurston Bros. is looking well. They are down 40 ft on the ledge—the deepest quartz mining ever done in that locality. The ledge is 16 inches thick, and there is a good-sized crushing on the dump. The Cannon-ball quartz mill being erected by Thurston Bros. will be ready to start by Thursday. It has a capacity of six tons in 24 hours, and is to be run by water power. At Badger hill, Brophy, Lang & Co. have a two-foot ledge that shows well in free gold. They have fifteen tons of ore out, and will crush it as soon as the Cannon-ball mill is ready. There are four or five more companies prospecting within a radius of four miles of Cherokee. Most of them are taking out quartz which they propose to have crushed at the same mill.

CHAMPION MINE.—The twenty-four tons of rock crushed at the Merrifield mill for the Champion Co. yielded \$25 per ton. Considering the large ledge there is no reason why the Champion should

not soon rank as one of the solid mines of this district.

Plumas.

CLEAN-UP.—Plumas National, April 16: Mr. W. Holmes cleaned up a few days ago, and for ten days' work showed eight and one-half ounces of nice dust. To-day he showed us \$8 worth for half a day's work. He says the bedrock in his claim is "lousy" with it.

San Bernardino.

PROVIDENCE MINE.—Calico Print, April 19: During the past month two new strikes have been made in the Bonanza King, showing large bodies of rich ore. The output from the mine is regular as clock-work, and the company's mill is running with a steadiness that nothing but able superintendency would guarantee. The Bonanza King Co. have been happy in the selection of their officers here in charge. Mr. E. Huhin, the Supt. of the mill, has shown himself to be the metallurgist of the coast. Mr. Callaghan, who has had charge of the mines for the past few months, shows much capacity. The selection of the working force indicate a poor showing for the saloon keepers. Mr. Morris S. Bates, as Secretary and Treasurer of the company, has, by his gentlemanly, courteous manner, won the good will of all those that come in contact with him. R. P. Kerr's big prospect, north of the Bonanza King about half a mile, is running through a large body of a high grade ore, from a shaft down about 40 ft. He has drifted east and northeast about 27 ft showing a continuous body of ore. He has a small force of men taking out for shipment which would have been shipped ere this but for one thousand storms here. The assays made are said to run up in the hundreds. The Kohinoor Co., which lies in between the Bonanza King and R. P. Kerr's mine, has a shaft down about 57 ft, having run through a vein of fine ore which dipped to the east. The company has not yet crosscut for the ledge. The owners of the Belle McGilroy mine continue to take out good paying ore, and are prospecting their mine thoroughly. The mine has a large quantity of ore on their dumps, with a large amount in, and bids fair to be another Bonanza King. Several other locations are looking very fine for the amount of work done. The Mozart, Lucknow and Mineral Point, and further south the Belle McGilroy and the Treasury and Morning Star lies in between the Bonanza King and the Belle McGilroy. There has an impression got abroad—no doubt spread by parties who are desirous of getting hold of some properties—that the water in camp is owned by the Bonanza King Co. Such is not the case; there are quantities of water for milling purposes. Messrs. J. B. Cook and Thompson have a large supply of water, and only had to sink about 25 ft. Dwyre and Gorman are the owners of a large spring of water running down the canon half a mile, and Mr. S. A. Barrett and others have water in the same neighborhood which is all close to the mines. The weather here has been unusually severe for this season of the year.

Sierra.

BALD MOUNTAIN EXTENSION.—Mountain Messenger, April 17: The Bald Mountain Extension Co. cleaned up Sunday 180 ozs., averaging \$2 60 per carload. The main tunnel, being run for the extension of the pay lead, is over 630 ft in the lava flow.

A GRAND DISCOVERY.—North San Juan Times, April 15: A new quartz location has been made by Harry Buhning and others near this place, which promises to become a good paying institution. The location is at a point where the American Company's tail sluices empty into the Yuba river below Sebastopol and within a mile and a half of this place. Rock taken from the ledge shows free gold, and is estimated by experts to assay \$100 to the ton. It appears that the flood, which was created by the breaking of the Milton dam, uncovered the ledge, and that but a few days ago it was discovered by a party who stumbled upon it. Where discovered, the ledge is about six inches wide between the walls, which are slate formation. The ledge runs northeast and southwest and can be traced for miles in Yuba and Nevada counties. Twenty-five locations have been made upon the ledge in the county alone. Our people are much elated with the prospect of having near this place a first-class quartz mine that will give employment to hundreds of workmen. Other quartz ledges will undoubtedly be discovered in this neighborhood in the near future, that will turn out bonanzas.

ANOTHER MINE TO BE OPENED.—Transcript, April 15: Supplies are being sent up to the Norway and Centennial quartz mines (under the same ownership) adjoining and situated in Eureka township, seven miles above the town of Washington and the work of developing those properties will begin next Wednesday by a force of six or seven men who will go from this city Tuesday under charge of David Ayres who has a contract for furnishing the labor. There is on the property a five-stamp mill run by water obtained from the North Bloomfield Company's ditch. The ledges are to be opened by tunnels which will give 2,000 ft of backs. The Norway has a small ledge that has never paid less than \$30 a ton, while in the Centennial the deposits are very extensive and average from \$8 to \$10 a ton.

Siskiyou.

HYDRAULIC.—Yreka Union, April 11: Mr. Wm. P. Bennett is running his extensive hydraulic claim vigorously, and expects to open the best, or one of the best mines ever opened on the Salmon. McNeal & McLaughlin are also working their valuable hydraulic mine. This mine has a splendid water privilege, a thing most necessary to the success of the hydraulic mines. Judging from past experience, this mine is paying well. H. Grant is also pipping away at his claim. This is also a good claim.

NEVADA.

Washoe District.

SIERRA NEVADA.—Virginia Enterprise, April 16: Crosscut No. 1 west, on the 3100 level, 80 ft north of the joint Union Con. winze, is out 16 ft, and is still showing some ore of low grade. Two-thirds of the width of the drift was in quartz for several ft in the start. This quartz contained much good ore, but all being taken out together across the whole width of the drift, it would not pay to mill. The face of the drift was beginning to show a considerable amount of water, therefore the diamond drill has been put in to feel ahead. At a point 123 ft north of

this crosscut they were yesterday cutting out for crosscut No. 2, and in cutting out were exposing some ore. The diamond drill was put in for a considerable distance at the face of the main northeast drift. It showed no water in that direction, and the material brought out—so far as could be judged—was about the same as that which had been exposed in the drift. Good progress, is making in the work of repairing and retimbering the winze between the 2300 and 2400 levels. It will be completed next week. In places it was almost closed, and the work done has already greatly improved the circulation of air in that part of the mine.

GOULD AND CURRY.—On the 2700 level the usual progress is making in the joint Best and Belcher east drift. The drift is in fair working ground, but is very hot. The north drift from the Bonner shaft on the 1200 level is just approaching the south line of the Con. Virginia. At this point it will be taken by J. P. Jones and others, who will proceed to mine the California and Con. Virginia upper levels for low grade ore.

ALTA.—The east drift on the 2150 level is now in the belt of trachyte which lies in front of the ore vein. This rock is very hard, yet fair progress in it is being made. The west drift on the same level is out over 1800 ft. No sign of a west wall has yet been found. The material is still a mixture of quartz, clay and porphyry, some of the quartz carrying metal. The water is being handled without any trouble.

HALE AND NORCROSS.—Are putting in drains and switch plates, and doing other necessary work on the south drift on the 2800 level connecting with the west drift from the Combination shaft. However, this preparatory work is about finished, and the running of exploring drifts and crosscuts will be next in order.

SAVAGE.—There is not much change in the flow of water from the north drift on the 2600 level. Now that connection has been made with the Combination shaft, on the 2800 level, the work of prospecting may be economically resumed.

YELLOW JACKET.—Sufficient ore is being regularly extracted from the old upper levels to keep the mills on the Carson river running to their full capacity. The quality of the ore remains about the same.

CHOLLAR.—The main west drift from the Combination shaft is being extended through the Chollar ground for prospecting purposes. As it is advanced it will be gradually turned to the southward.

UTAH.—The north drift on the 1950 level has been extended 33 ft. The face is in vein material, showing quartz, porphyry and clay. The ground continues quite dry and works well.

CROWN POINT.—Ore sufficient to keep the mills going to their full capacity is being regularly extracted, and the exploring drifts have exposed much more ore than that will pay for milling.

CALIFORNIA.—The east drift on the 2900 level, joint with Con. Virginia, is being pushed as rapidly as possible in ground that works very well.

CON. VIRGINIA.—The joint California east drift, on the 2900 level, is being advanced at the rate of nearly 30 ft per week.

MEXICAN.—The winze on the 3100 level is down 20 ft. It is still in about the same material as that in which it started.

UNION SHAFT.—The upraise to the drain drift on the 1600 level, leading out to the Sutro tunnel, are still continued.

BELCHER.—The several drifts on the old upper levels continue to yield well, and the mills are all kept going.

ANDES.—The usual prospecting work is being done, and some ore is being taken out that will pay for milling.

OPHUR.—Ore is still being extracted on the 150 and 250 levels.

Belmont District.

BELMONT.—Courier, April 19: On Monday last we visited the 200 south level of the Belmont mine. There is considerable rich chloride and black metal ore exposed in this portion of the mine. The ledge averages four ft in width, and the work of development is being pushed as rapidly as possible. The level continues in good ore and the prospects never have been more favorable than they are at present since work was commenced on it. In order to facilitate operations under ground, they have hoisted several tons of ore to the surface. Asa B. Eastwood, the Supt., *pro tem.*, informs us that it is the intention of the company to thoroughly prospect this portion of the mine—it being entirely virgin ground—and that he expects to extract many tons of high grade ore between now and summer.

Bristol District.

DAY.—Pioche Record, April 12: Some 75 tons of ore from the late strike on the Day mine has reached the furnace, and it is fully as good as we have heard it represented. The ore is a copper-colored carbonate, with rich chloride of silver all through it, and is unquestionably the best lot of rock we have seen come from the bowels of mother nature in a long while.

Columbus District.

MOUNT DIABLO.—True Fissure, April 19: The west drift near the Callison winze, on the second level, now shows a total length of 107 ft, and has some promising spots of low grade ore. The south crosscut from the east drift, on the second level, has been driven 21 ft and has passed through a small streak of ore about 4 inches in width, assaying about \$50 per ton. On the intermediate, between the first and second levels, the east drift has been run 11 ft. Its face is showing eight inches of \$90 ore. A distance of 12 ft has been made in running the west drift on the first level without developing any change in the formation of the ground. The sinking of the incline has encountered some very hard ground, only 11 ft of headway having been made during the week. It is now down a total distance of 73 ft below the third level.

COLUMBUS CON.—The fourth level crosscut was extended 10 ft during the week, making a total length of about 85 ft. The material in the face continues about the same as when last reported. The work of extending the main drift on the third level was discontinued. Its present length is about 250 ft. The west drift from the main drift on the third level has attained a length of 75 ft, and the face of the same is in broken vein matter. Crosscut No. 1, on the same level, has attained a length of 35 ft.

The same is being run through ground that looks Eureka District.

LOCAL NOTES.—Sentinel, April 15: The Helen Mortimer, held under lease by Judge Doolin, Jerry McMahon and Dennis Crowley, shows lots of ore and a prospect for a big mine. The ore taken out by the lessors runs from \$50 to \$100 and averages \$80 per ton all through. This mine is said to have the best defined vein in the district. It adjoins the California on the south, which is another fine property. The Hamburg tributaries are all in bonanza. Two of them have over 100 tons out. The Connolly is opening out well. Joe Molino and Alex. Fraser have it rich in the Altoona.

Ellsworth District.

THE MOUNT VERNON.—Belmont Courier, April 19: We understand that the owners of the Mount Vernon mining property at Ellsworth, this county, will, in the near future, resume operations on the Mount Vernon mine. Enough money has been raised East to work the mine in a systematic manner. We are glad to know this, for the reason that persons who have a thorough knowledge of the property believe the Mount Vernon is a good mine. The company has already expended \$70,000 on this property, and considerable work has been performed upon it. The main shaft has been sunk to a depth of 159 ft, and it has a capacity of 7x9 in the clear. The tunnel has been extended 700 ft, and the tunnel level has been prospected for a distance of 300 ft on the course of the lodes. About 66 ft below the tunnel they have intersected the Kohinoor ledge, and have crosscut 200 ft toward the Alhambra lodes. The company has a tunnel right of 3,000 ft. Captain Robert Knapp, the Supt., firmly believes that by sinking 100 ft more they will encounter a good body of paying ore. We wish the owners of the Mount Vernon success.

Gillis Mountain District.

HIDDEN TREASURE.—Esmeralda Herald, April 12: J. B. Hiskey, surveyor, has returned from Gillis Mountain mining district, where he went to survey the Hidden Treasure and Yellow Jacket mines. From him we learn that the Hidden Treasure is the mine out of which ex-Sheriff Clem Ogg and his partners took so much money. The present company have an incline 160 ft down on the dip of the vein, which is about 20 degrees, from which several drifts have been run all the way in fine ore of high grade. Ten miners are at work on this mine extracting ore to be shipped to Dayton for reduction. Certainly in the near future some company will erect reduction works in the vicinity of Luning for the reduction of the rich silver and copper ores there—by saving the cost of transportation and exorbitant percentages exacted from shippers and furnishing means of reducing ores of a grade that cannot be sent away for reduction, but would pay the owners some profit if worked here. And it would also give employment to many men and teams, and be of general satisfaction to this community.

Very favorable for ore. The west drift from the winze on the adit level has attained a length of 25 ft, and the ore in the same continues as last reported. A drift has been started to the east from the same point, following a seam of good grade ore. Crosscut No. 3, from the main drift on the 150-foot level has been started, and it is being run through ground that is favorable for ore.

Pioche District.

TO RESUME.—Pioche Record, April 12: Work will be resumed by the Bullionville Smelting Co. this summer, and we learn from Salt Lake that the works for working tailings will at once be placed in order. It was out of the tailings at Bullionville that the company managed to get the money to work their mines at Frisco, Utah, and as soon as they closed down at Bullionville they were shortly compelled to close the company's works at Utah.

Reveille District.

BACKWARD.—Belmont Courier, April 19: From C. A. Ogden, who arrived in Belmont on Monday from Reveille, we learn that the cold weather has greatly retarded mining operations in that district. Jos. Bianchi & Co. have received nearly all of their leaching materials, and it is expected that the balance will soon be hauled in from the railroad. The Norris Brothers have several good prospects at Reveille and they believe that they will make a good showing next summer. There are a number of prospectors who will resume work as soon as the weather permits. The striking of paying mines at Reveille is not improbable.

SILVER LICK.—Sentinel, April 18: This mine, from which large quantities of ore have been extracted at different times in the history of the camp, has recently sprung into new life, and is now yielding better ore and more of it than ever before. The property is in charge of Supt. J. C. Powell, who has leased it to tributers. There are six of these who are making their "pile" out of it. The boys will soon be getting coin for their rock. It is encouraging to know that there are a score of other mines in the neighborhood which show up as well as the Silver Lick does. It looks as though the old camp will be in bonanza all along the line this summer.

Tuscarora District.

HYDRAULIC MINING IN TUSCARORA.—Times Review, April 14: A company of Chinamen are rigging a hydraulic apparatus for gold washing at Eureka ravine. They have sent to San Francisco for several hundred ft of hose and intend to put in about a thousand ft of flume. This will be the first attempt at hydraulic mining in this district. Several other Chinese companies are setting sluices for placer mining Gardner, Canton and Halfmoon ravines. The water supply this season is more plentiful than ever before, and the Mongolians expect to be able to continue work a month later than usual. All of the companies get their water from the ditch which they have leased from the Beard Bros.

DRAINING THE MODOC.—The Beard Bros. are rigging a hand force pump with which to drain the Modoc mine. The incline is down 90 ft and the water has risen to within 20 ft of the top. They think their pump will drain the mine to a depth of 150 ft. The ledge at the bottom of the incline is upwards of seven ft in width with quite a number of streaks of rich ore. It has greatly improved in appearance in the last ten ft and the owners feel correspondingly encouraged over the prospect.

CENTRAL CON.—East drift, old workings, extended 25 ft; assays from face \$18.50 to \$25.00 in the west drift, are stopping out some fair grade ore.

INDEPENDENCE.—During the past week the usual

progress has been made in the west crosscut and upraise on the 300 level.

NAYAGO.—Work in and about the mine progressing as usual. The mill has crushed the usual amount and grade of ore. Shipped \$8,225.00 last Monday.

NORTH BELLER ISLE.—Have commenced cleaning out crosscut No. 2, 350 level, preparatory to resume work in the same. Have let a contract on 70 level, to run a drift north.

BELLER ISLE.—Winze No. 1, 350 level has been sunk six ft during the past week. Have put blowers and pipe on 450 level, and started a crosscut to connect with winze No. 1.

ARIZONA.

MOHAVE.—*Miner*, April 15: Supt. Fisher of the Schuyllkill mine tell us that the new shaft is down 75 ft with eight inches of good ore in the bottom. Fred Buer has sold one-half interest in the Last Salvation claim to John T. Davis of Hackberry. This claim is in the Music mountain district. The heavy rains of the past week will again retard mining operations in this district for some time to come. The well at the Corbat mill is full to overflowing. A constant stream of water has been running from it for weeks. Messrs. Cole and Caffrey of the Alpha mine were in town last Sunday. They recently shipped nine tons of ore from this mine which netted them \$900. The ore was shipped without much sorting as a sample lot, and the boys are very well pleased with the returns. They are good workers and deserve to succeed. Louis Davidson has sold three-fourths interest in the following mines, viz: Oro Fino, Great Western, Great Eastern, Boss No. 2, and Alvoid mines to L. Simmer, for one silver dollar. A. B. Warner has sold his interest in the Alpha, Warner and Standard claims to Ed. F. Thompson for \$250. A deed from J. E. Hollenbeck of Los Angeles to M. Salsbury of San Francisco conveyed the Schenectady and Schuyllkill mines at Chloride has been placed on record. The consideration expressed in the deed is \$3,000. Jett, having disposed of one-half of the Buster claim in Maynard district to T. L. Ayres and the other half to J. K. Mackenzie. Two lots of ore shipped by B. Fredericks from the new Groom's Peak district to the Hackberry mill sampled as follows: Lot F, three tons, 147 ounces silver per ton, lot K, one and a half tons, 345 ounces per ton. The ore was sold to John Howell on the basis of 90 per cent of the market value of the silver, less milling charges. There is no ore in the Quijotoa, Coeur d'Alene, or any other of the much-boomed districts that will average any better than this.

BONANZA MINES.—*Quijotoa Prospector*, April 12: There is nothing special to report this week. Work is progressing in a very satisfactory manner in all the tunnels, which are daily drawing nearer the vein. Owing to a miscalculation in the measuring, some ninety ft more than first supposed will have to be run in all the tunnels. This error occurred by believing that a vertical line drawn from the top of the mountain would strike the mouth of the tunnels, but it was found that such was not the case, there being a difference of about ninety ft between the points mentioned.

PERKLESS.—Tunnel No. 1, east side, is cutting about the same kind of ground it was last week. On Wednesday it measured 134 ft.

WINZE.—The winze was down 64 ft on the 9th inst. in high grade ore, which has materially improved since the last report.

HORSE MOUTH.—The crosscut on the vein at this point was on Wednesday last 30 ft in length. It showed indications that the wall was near. It is quite probable that a drift will be started to the south on the vein some time this week. The 30-foot crosscut is in good milling ore.

SHEEP NESE.—Nixon Palmer, Supt. of this property, arrived in town last Friday evening from San Francisco, but owing to his absence on Wednesday last the mining reporter was unable to see him and learn the intentions of the company. Work on the tunnel is being pushed with customary vigor through the same quality of ore.

In looking over the mining news of Mohave county I seldom see any mention made of "Chloride," that rich old mining camp just north of Mineral Park; yet many of the best mines in Mohave county are situated in Chloride, and more high grade ore is shipped from that section than from any other camp in the great Wallapai district. The "Pink Eye" mine, of Chloride, is one of the very best mines of Mohave county. When I last saw the mine, the shaft sunk on the hanging wall was 70 feet deep. A cross cut, drove from the bottom of this shaft, 13 ft, cut through a large ore body that assayed over \$70 in silver, per ton. Drifts running north and south on the ledge, 30 feet below the surface, showed a fine, strong vein of rich chloride and gray carbonate ore. The flow of water in the mine prevented the owners from sinking the shaft deeper.

GALIARA AND BUNKER.—*Tombstone Epitaph*, April 12: From Ed. Clark, who has recently returned from the Galiera and Bunker Hill districts, it is learned that work on the Jackson claims, in the former district, is being prosecuted with good results. Two shafts about sixty ft in depth each, have been sunk, the bottom of each showing good ore. On the Jennings claim an ore body assaying about \$400 per ton has recently been struck. The Tweed copper claims, on the Gila, will soon have a large force of men put to work on them. A claim known as the Morning Flower, in Bunker Hill district, is being worked by a man named Hinditer, and some exceedingly rich ore taken out. Samples brought in by Mr. Clark will assay into the thousands.

TURKEY CREEK DISTRICT.—*Cor. Prescott Courier*, April 12: A big strike in the Roach mine is the only excitement in camp. The boys have struck over a foot of ore in the shaft that will assay up into the hundreds. The Chase company are going steadily ahead, pushing work on the mines and mill. Seeing no prospect of the road being repaired between here and Prescott, the company have concluded to have their machinery hauled in by way of Big Bug. For this purpose they have put a force of men to work repairing the old Bully Bueno road.

PROSPECTS AT QUIJOTOA.—*Prospector*, April 19: Every successful mining camp goes through three stages of existence. First, there is the discovery, and a grand rush from all parts of the coast. Men with every sort of object in view, and with no object at all, flock to the new El Dorado, to make a for-

tune. The second stage is the reaction from the first. Every description of business is overdone, real estate has been driven up to Broadway prices, and folks had that twenty-dollar pieces are not much more plentiful on the bushes here than elsewhere. Discouragement causes many to leave. Then comes the third stage, when work in earnest has been commenced on the mines, money is being disbursed regularly, and all legitimate business is brisk and remunerative. Our camp is at present passing through the second of these stages. Because the Bonanza mountain has not been cut through like a piece of cheese, and the riches it contains reduced at once into bullion, some folks, who have had little experience in mining camps, are becoming anxious about the future, and take a gloomy view of things generally. Such ideas are very unreasonable. It takes time to bore into a solid mountain. Work is being pushed as fast as unlimited means and skill can do it. This is, however, not like a placer camp, where every man can take out three or four dollars a day and place a large amount in circulation. The mining outlook is better here than it has ever been, and those long-headed persons who are evincing their faith in the future by putting up solid improvements, will, in a few months, reap the reward of their enterprise.

SPICER DISTRICT.—*Quijotoa Prospector*, April 19: The Spicer district, which covers the Mica Lake range, about 17 miles distant from Quijotoa, is attracting considerable attention. Among the most promising properties located there are the Spicer claim, Silver Jim, Louisa Byron, Hidden Treasure and the Mahar. From the latter claim ore assaying \$500 to the ton is being shipped. A shaft is now being sunk on the Silver Jim, which assays \$250 per ton. Several mining men who have visited that section say that it has a bright future.

COLORADO.

A GOLD EXCITEMENT.—A dispatch from Denver, dated the 20th, says: Intense excitement prevails throughout Colorado over the recent rich discoveries of gold on West Oil and Cottonwood creeks, near Canon City, in this State. Mining men are working themselves into fever heat, and although the rich quartz was found only a few days ago, already there are hundreds of fortune hunters on the way to the new diggings. The first discovery of gold was made by a man named Teller, on a ranch owned by John O'Brien. The ranch was prospected many years ago, but it is thought that the coating of the gold or its being in chloride form held in magnetic iron and covered with oxide of tellurium, prevented it from showing in the pan, and nobody thought of making scarification or erubile test. Several assays already made run from 10 to 100 ozs. in gold, with a probable average of 35 ozs. At first many were inclined to believe that the excitement was gotten up by some of the railroads, as an offset to the Coeur d'Alene mines, but little doubt is felt now that the strikes are genuine, and that they will result in giving another impetus to this State. From all parts of the country miners are flocking to the diggings, confident of finding the much-desired wealth.

WHITE PINE.—*Cone*, April 12: Work is progressing steadily on the Valhalla tunnel. The day shift is making from six to eight inches a day. Penney and Claypool are working their Horse Shoe property, the Ella Rhoat. They have a fine carbonate lead. Howard Pierce has the Sedalia down over 100 ft, and is pushing the work right along. He will have a pay mine there before he quits. If Judge Gerry dissolves the injunction to-day, we understand the Eureka people will put on from 75 to 100 men, and make things hum on the hill. It has been rumored this week that the North Star would resume work next Monday. We have been unable to see any of the managers, but trust the report is true. The Star is too good a mine to remain long idle. E. M. Paine and Hopkins brothers have taken a contract to sink and timber 30 ft on the Paymaster, and 20 ft on the Nimrod, for a third interest in both claims. The contract was secured from Ed. Kenyon and Robert Smith. The claims are located near the Silver Trowel, and the owners think they will have pay ore by the time the contract work is completed. If not they will continue work until they do find it.

NOTES.—*Register-Call*, April 18: George Ebert and Richard Jenkins, who are working the Wyoming ledge, over on Fall river, sent a run of ore to the mills at Georgetown a few days ago, for which returns gave 110 ounces of silver and four per cent of copper for first-class, and fifty-two ounces silver and one and one-half per cent of copper for second-class. When taken into consideration that the above ore came from a depth of only 30 feet, the richness of the vein shows it to be much better than the average. Stratton, Eads & Breton, lessees of the Main mine, who have been doing dead work from the main shaft on that vein, in raising from the workings on the same through the German tunnel, have made connection, and as soon as the proper stulls can be put in will commence breaking ore, the ore body in sight covering a block fully 200 feet as passed through in sinking and raising. A reporter of the *Register-Call* yesterday afternoon observed a load of ore amounting to about three tons pass through the city from the Silver Plate mine, which is located under the northerly wing of Bald mountain. The First National Bank shipped \$8,200 in gold bullion to the Denver mint yesterday.

NEVADAVILLE DITS.—A Nevada correspondent contributes the following local dots from that place: The Ute mine owned by D. H. Andrews, H. J. Hawley and J. S. D. Manville, have everything in smooth working order about that property. The main shaft is being sunk by three 8-hour shifts of miners. This vein will soon be in condition to turn out a large amount of milling and smelting ore. The First National Bank company's property on the Burroughs lode, recently leased to Captain Noonan and others, and which has been idle for five or six years, is being developed by sinking the main shaft. The lessees have erected a new and commodious shaft house, and have a plant of machinery of sufficient capacity to sink the main shaft to a depth of 1,200 feet. A contract was let last week for sinking an additional 75 feet. The outlook in the lower workings is very encouraging. In past years this portion of the Burroughs paid largely for working. McFarlane Bros., contractors, have a force of mechanics at work erecting a new shaft building over the main shaft on the Hubert mine.

The machinery formerly used on the Forks mine is being removed and will be placed in the building. Mr. Henry B. Singer, the superintendent, has miners at work enlarging the shaft and making other necessary underground improvements.

IDAHO.

NEW GOLD FIELD.—*Bellevue Chronicle*, April 15: E. J. Smiley, of Resurrection district, 12 miles below Bellevue, was up yesterday with some fine specimens of gold ore from a new strike in the Smokestack and Orient. This ore ranges in value from \$30 to \$200 per ton, and is a little ahead of any yet discovered there. The Smokestack joins Hailey & Smith's Susie S. on the west, and the ledge is as wide as that of the Susie. Mr. Smiley has been at work there all winter and is much elated over the success of his labor. Hon. John Hailey contemplates erecting a re-stamp gold mill there the coming summer, and will soon have a force taking ore from the Susie S. Col. Canavan and Gen. Schenck, of Bellevue, also own some gold mining property in the district and propose to begin work soon. Col. Canavan took samples of the new strike, in which free gold was plainly visible, to Boise City with him, and will interview Hon. John Hailey concerning the mill project for the new district.

THE MAYFLOWER VEIN.—*Wood River Times*, April 12: After nearly two years of active search, the continuation of the Mayflower vein has been found, at a depth of about 200 ft below the old ore stopes, and at a point about 200 ft westerly of where it should have been. Those familiar with the facts will remember that in the workings from the lower Mayflower tunnel level, the vein was entirely lost after a depth of 50 or 60 ft had been gained by the prospecting winzes, and this caused well-founded alarm for the future, not only of Bullion, but of all the Wood river mines, as it was argued that if the Mayflower vein did not go down in depth there was no likelihood of any of our veins going down. The re-discovery of the Mayflower vein will, therefore, have a tendency to strengthen the confidence of owners and investors in our mines. It will be interesting, in this connection, to note the developments of the vein, to ascertain if it maintains its ore-bearing character.

COEUR D'ALENE.—*Cor. Inter-Mountain*, April 16: I have just seen the world wide Mother lode. It is a big boulder of quartzite on the edge of the creek under an overhanging mountain of slate. It is without pitch, shape, strike, wall or anything that goes to constitute a true fissure and the area of exposure is only about 5x10 ft. Next to what passes to the hanging wall is a very pretty display of gold spattered over the quartz but it does not appear how deep it sinks into the rock. Otherwise the chunk of quartzite is barren to all appearances. It is owned by two old men, and two good miners in ten hours could do more work than has yet been done on the property. The old fellows stand in the waters of Prichard creeks up to their waists, while eager visitors almost swim to get a glimpse of the fabled treasure. They will have to swim in dead earnest when the creek rises another foot. This mother lode is the only thing in the quartz line worth speaking of in this whole region as far as my observations have extended. I have not yet seen any specimens around here that a Montana prospector would tolerate around his cabin. Notwithstanding all this the country is big enough to contain good quartz camps and they may be struck yet, but as far as this excitement is concerned it is a miserable fraud. All classes of business men are sick and disgusted as everything is overdone. Provisions are cheaper than formerly, but wages are low. A very few weeks now will tell the tale.

COPPER.—*Wood River Times*, April 16: A report has been current in town during the past few days, to the effect that the famous group of copper mines in the Lost River country had been sold to English capitalists; but a *Times* reporter found upon investigation, that there was no foundation for the report other than the fact that the owners had had refused to consider a proposition to sell outright for over half a million dollars cash, or to bond the property for \$800,000. The group of mines referred to consist of five claims named, respectively, Old Judge, Copper King, Buena Vista, Golden Wave, and Henrietta. They are located in a range of mountains lying westerly from Lost River valley, and about half-way up the valley. The vein—if vein there be—has massive outcroppings 800 ft wide, and the total length of the vein covered by the locations is 3,500 ft. In this ground some 15 or 20 shafts and several cuts have been made. The greatest depth of any shaft is 60 ft; greatest length of any cut, 40 ft. But all of both cuts and shafts show solid ore on all sides that ranges from 20 to 50 per cent in copper, and from a few ounces to several hundred ounces in silver. The average of a large number of assays made in this region, in Salt Lake, in Denver, in Omaha, in San Francisco, and in New York City is 41 per cent copper and 75 ounces silver, or a value of about \$197 per ton. These assays while not made from selected ore, were, however, made from brown and black oxide and sulphurets ore which are undoubtedly above the average run of ores in the claims. But they were undoubtedly fair average samples of one portion of the vein from which thousands of tons, at least, can be taken. These claims are owned by Frank Brown, the Bruners, and G. A. Williams, a well-known attorney, who propose to develop them, as they say that the property is too vast and evidently too valuable to permit even an approximate idea of its worth being formed. They have men working on the claims now; but as soon as the roads are open they will put on a heavy force of men and will doubtless, before the season is over, have two or three of the matting furnaces of the Pacific Iron Works turning out matte by the car-load. It is no wonder that the owners of this property are unwilling to sell. If half of what is reported about it is true they have the most gigantic deposit of ore ever found in the world. Such is its width that mining men will not, until the contrary shall have been demonstrated, believe that the 800 ft claimed for the width of the vein is anything but a blow out or horizontal deposit caused by some convulsion of nature.

MONTANA.

NEW SMELTER.—The Parrot Co. will build a new smelter. Timbers are being framed, excavations are going on, and the whole work will be completed by the fall. New smelter will concentrate 150 tons of

ore per day and be furnished with one blast furnace of a capacity of 75 tons to 80 tons every 24 hours. Copper bullion instead of matte will be shipped from the new works. The present works are producing 750,000 pounds of pure copper per month, or 25,000 pounds a day. Reckoning this copper at 14 cents a pound, it will be seen that the daily output of this smelter alone amounts to \$3,500, or \$105,000 a month. Dr. Peters informed the reporter that there was but one smelter in the United States, the Calumet and Hecla of Lake Superior, that surpasses the Parrot in its output of the metal. The works concentrate about 100 tons of ore daily and run 80 to 85 tons into matte. When the new smelter is completed the company will purchase ores at reasonable rates thus enabling owners of copper mines, now laying idle, to realize upon their properties. The new works will be built a few rods southwest of the present ones. The narrow-gauge railroad running from these works to the mines, will be completed within the next ten days. The grading is all done and truck lading is progressing satisfactorily.

THE ANACONDA.—This vast property, whose productive capacity is perhaps greater than that of any other copper mine in the world, continues to be developed with the regularity and system of clock-work, though the policy of the management as to the publication of news concerning its operation is extremely conservative. From a reliable source it is learned that between the 200 and 800 levels, inclusive, 14 lifts are being extended, seven east and seven west. The face of each of these drifts is in solid ore and has been from the several crosscuts. There is no mine in the western territories in which operations are conducted on such a scale, nor in which the ore occurs with such uniform regularity with respect to richness and extent. The product of the mine is made up entirely of the ore necessarily extracted in extending the drifts. Yet the output amount to thousands of tons monthly, of which 2,500 tons assaying upwards of 50 per cent copper, are shipped in a crude state to Swansea. The dump is assuming gigantic proportions and must now contain in the neighborhood of 175,000 tons of low grade ore, susceptible however of profitable treatment. The company is working over 300 men in and about the mine.

THE BELL.—*Inter-Mountain*, April 18: The Bell smelter is now treating daily 30 tons of ore in one of its blast furnaces and is producing eight tons of matte, which is sent regularly to Swansea. It assays over 50 per cent copper and contains more silver than any other matte produced in Butte, except that of the Colorado smelter. The concentrator to be run in connection with the smelter will be started up on Monday, and as a result, the matte will be of much better quality than heretofore. About fifty men are employed at the works. The condition of the mine is quite satisfactory. The 400 foot level is now yielding about 30 tons of ore daily from the faces and stopes. In the west drift, the ore was of low grade until recently, but a large body of a much better quality has been struck this week. It assays well and seems to be permanent.

NEW MEXICO.

ORGAN.—*Cor. Rio Grande Republican*, April 18: The crusher started up again last Tuesday. It is running on copper ore from the Memphis mine, Jenkins and Robinson are doing well on the Little Buck. They are taking out large quantities of high-grade ore. The boys must study up in mineralogy, or they will get left. Some of them were caught throwing away rock that averaged \$200 a ton. Henry Willman has taken out about fifteen tons of very rich ore. The vein is three ft wide, and his prospect looks very favorable for a good mine. The smelter machinery has not yet arrived, though it is looked for daily. When it does arrive, Mr. Roney calculates to have it up in thirty-six hours. They are still sinking on the main shaft of the Galloway, and timbering it up for permanent work. They intend sinking it 200 ft at least this summer. The view from Col. Crawford's camp, near the Galloway mine, looking in the direction of San Augustin Peak, is one of the loveliest that nature can afford. No work is being done on any claim between the Memphis and Little Buck, that we can hear of. All attention seems to be drawn to the San Augustin Peak district. The Thinnerholt, belonging to Foy Bros. and Hoopes, shows fine indications for a good mine, but it has not been opened up much yet. The ore is about the same as all that is found in that district. The Little Chloride is down six or eight ft in gray copper and chlorides, with some sulphurets. It assays \$420 in silver, and 20 per cent copper. It is owned by Crouch and Metcalf, and work on it is being pushed. J. S. Jarnigan has found a new lead near Henry Willman's claim. Chlorides and sulphurets running high in silver. Now that he has found good ore, there are several parties rushing forward to claim a prior location. The Yellow Jacket and El Moro are two claims near the Pass. The latter is yielding nice looking ore. The former has had very little work done on it, but it promises well. Both belong to Hufford, Purdy and Metcalf. The Climax, owned by Metcalf, Purdy and Hertzog, shows up sulphurets and galena assaying \$400. It is a cut of 20 to 25 ft long which strikes a vein from two to three and a half ft wide, between syenite and porphyry, and looks as if it would make a fine lead. From the north shaft of the Galloway they are taking out chloride of silver, slightly mixed with galena and probably some iron, making a mineral of a pretty red and green color, which runs from 1,000 to 1,500 ozs. in silver to the ton. All of it is very carefully sacked for shipment, and over \$7,000 worth has already been taken out. The shaft is 15 to 20 ft deep, and the vein lies between porphyry and granite, with a foot of ore, every ounce of which will pay to ship.

UTAH.

SAMPSON MINE.—*Park Record*, April 19: Mr. Pierson presented us a piece of ore from this mine (out of the new shaft) that seems to be exceedingly rich, and says they have over three ft of splendid pay ore in a vein twenty ft wide between porphyry and quartzite walls. The balance of the gangue between walls is a brown oxidized quartz carrying considerable mineral and a material that would prove an excellent flux in smelting the ore. With a new invention of furnace to be introduced by Dr. Brawer, these and the Crescent ores will flux themselves.

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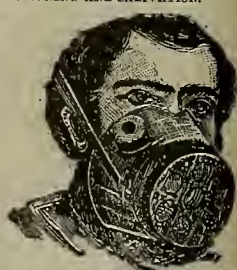
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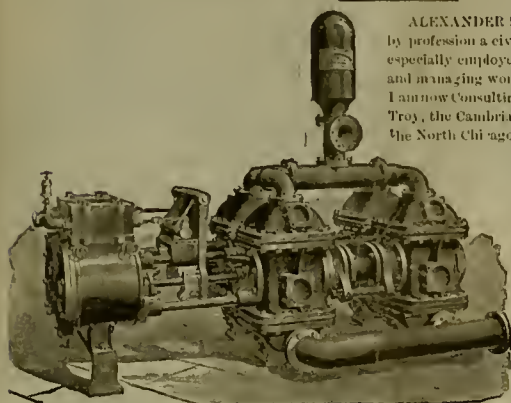
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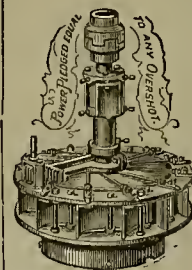
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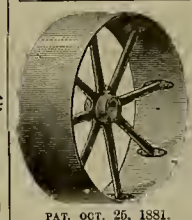
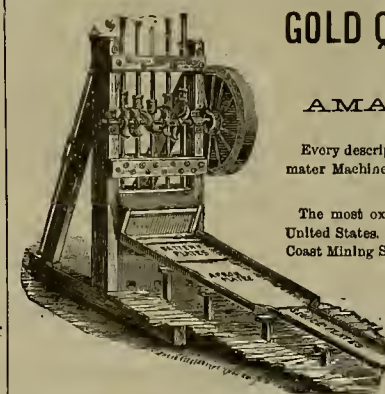
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E. G. DENNISTON, Proprietor.



PAT. OCT. 25, 1881.

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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.]

FOR WEEK ENDING APRIL 15, 1884.

296,916.—SYSTEM OF PROPELLING CARS BY MEANS OF CABLES—John L. Boone, S. F.
297,061.—SAFETY CAR TRUCK—Sam'l Brown, S. F.
297,072.—APPARATUS FOR DISTRIBUTING ELECTRICAL CURRENTS—G. W. Dubrow, Portland, Or.
296,938.—SASH CORD GUIDE—W. C. Gilmer, Oakland, Cal.
296,949.—TWO WHEELED VEHICLE—W. T. Goodman, Fulton, Cal.
296,744.—CARPET SEWING MACHINE—Geo. Grisel, Oakland, Cal.
296,868.—COPY HOLDER—E. Nunan, S. F.
297,014.—CONVERTIBLE CHAIR AND BEDSTEAD—Eli. Rundel, Santa Barbara, Cal.
296,879.—BALANCE TIP FOR BROOMS—W. A. Scollay, S. F.
296,903.—DEMIJOHN OR BOTTLE SAFE—L. P. Wollard, Oakland, Cal.
4,074.—LABEL—S. W. Sperry, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co. in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through DEWEY & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AIR AND DUST SEPARATOR.—John P. Anderson, S. F., assignor of one-half to Spivalo and Forman. This machine is specially useful in connection with the dust chambers or the purifiers of flour mills. In the separation of fine dust in flour mills, suction fans or blowers are used, and the dust drawn out by the fans is forced into a dust chamber. To continue the operation it is necessary to have a chimney, through which the current of air can escape, and up this more or less dust goes, causing a nuisance in the neighborhood. To overcome this, a circular hole is cut by this inventor in the side of the chimney, just above the dust chamber, and a small propeller shaped fan is put in. This wheel or fan is just fitted to turn in the tube. The chimney is closed above the wheel and the current of air which escapes from the surplus within the dust chamber strikes against the vanes in passing through the wheel, and causes the latter to rotate rapidly. The effect of this appears to be to cause a reactionary current, which changes the direction of the dust particles and deflects them back within the chimney, so that they settle within the dust chamber, while the air passes out through the spaces between the inclined vanes of the wheel clear and free from dust.

OVERALLS.—Wm. A. Dawson, Stony Point, Sonoma Co., Cal. No. 295,619. Dated March 25, 1884. The object of this invention is to make the pants and overalls more durable by re-enforcing those parts upon which the greatest amount of strain and wear comes. In the corners of the pockets a peculiar coiled stitch is made. This is commenced by running a circular stitch across the main seam at each corner of the pockets and then decreasing the ends towards the center. Instead of lining the pants throughout they are lined only where subjected to the greatest wear. These parts are the front of the leg, the seat and the crotch. Two pockets are made on each side of the back by first forming a large pocket and then running a line of stitches down the center. An extra seat piece is put in also, and the waist-band is peculiarly made.

ROTARY PUMP.—John M. Wiles, Butte City, Colusa county, Cal. No. 295,704. Dated March 25, 1884. It consists of an exterior case with inlet and discharge passages, an interior cylindrical drum revolving on an axis, which is placed eccentric to the outer case, and slotted to receive buckets, and a loose elastic ring which is placed within the drum and the inner edges of the buckets, against which it presses and holds them out to the inner face of the case.

GRAIN SEPARATOR.—Pontalia L. Nash, Hollister, No. 295,668. Dated March 25, 1884. The improvements covered by this patent mainly consist of certain details of construction difficult of intelligent description without the aid of engravings.

New Incorporations.

The following company has been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

LITTLE GRANT M. Co., April 18. Location, Arizona. Capital stock, \$10,000,000. Directors, C. C. Harvey, F. G. Margetson, W. R. Sherwood, Joseph Marks and S. F. Ralston.

ARLIE M. Co., April 18. Location, Arizona. Capital stock, \$10,000,000. Directors, C. C. Harvey, F. G. Margetson, W. R. Sherwood, Joseph Marks and S. F. Ralston.

PIMA M. Co., April 18. Location, Arizona. Capital stock, \$10,000,000. Directors, C. C. Harvey, F. G. Margetson, W. R. Sherwood, Joseph Marks and S. F. Ralston.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S. M. Co.	Nevada.	29.	50.	Mar 27.	May 22.	W. H. Watson.	302	Montgomery st.
Andes S. M. Co.	Nevada.	24.	25.	Apr 18.	May 19.	J. B. Butts.	309	Montgomery st.
California M. Co.	Nevada.	17.	10.	Apr 15.	June 16.	E. M. Hale.	337	Pine st.
Best & Belcher M. Co.	Nevada.	15.	50.	Apr 15.	May 21.	W. W. Miles.	309	Montgomery st.
Belle Isle M. Co.	Nevada.	7.	20.	Mar 12.	Apr 17.	J. W. Pew.	310	Pine st.
Belmont M. Co.	Nevada.	36.	75.	Feb 20.	Mar 31.	J. W. Pew.	310	Pine st.
California M. Co.	Nevada.	11.	20.	Mar 14.	Apr 21.	C. P. Gordon.	309	Montgomery st.
Champion M. Co.	California.	14.	67.	Mar 7.	Apr 10.	Thos. Wetzel.	522	Montgomery st.
Con Virginia M. Co.	Nevada.	20.	12.	Apr 12.	May 16.	E. W. Havens.	309	Montgomery st.
Chollar M. Co.	Nevada.	13.	50.	Apr 21.	May 23.	J. W. Dean.	309	Montgomery st.
Daisy Cement M. Co.	California.	1.	2.	Mar 27.	May 1.	C. J. Collins.	512	Montgomery st.
Diana G. M. Co.	Nevada.	5.	10.	Mar 5.	Apr 9.	P. J. Flanagan.	318	Pine st.
Dayton M. Co.	Nevada.	12.	20.	Apr 16.	May 20.	D. C. Bates.	309	Montgomery st.
Excelsior Water Co.	California.	6.	50.	Jan 29.	Apr 14.	J. H. B. Wheaton.	215	Sansome st.
El Dorado M. Co.	Nevada.	2.	08.	Mar 8.	Apr 9.	H. B. Sayre.	330	Pine st.
Elko Con M. Co.	Nevada.	3.	15.	Mar 4.	Apr 8.	F. Spiering.	309	California st.
Gould and Curry M. Co.	Nevada.	47.	50.	Mar 7.	Apr 11.	A. K. Durbin.	309	Montgomery st.
Grand Prize M. Co.	Nevada.	23.	25.	Feb 9.	Apr 3.	E. M. Holmes.	430	California st.
Gorilla M. Co.	Cal.	3.	15.	Feb 27.	Mar 31.	A. A. Enquist.	436	Montgomery st.
Independence M. Co.	Nevada.	13.	20.	Mar 12.	Apr 16.	J. W. Pew.	310	Pine st.
La Grange Ditch and M. Co.	California.	8.	50.	Mar 31.	May 5.	C. Halsey.	328	Montgomery st.
Lady Washington M. Co.	Nevada.	4.	10.	Apr 10.	May 9.	W. H. Watson.	302	Montgomery st.
Lake County Quartz M. Co.	California.	8.	12.	Mar 10.	Apr 16.	A. Baird.	430	California st.
Mexican G. M. Co.	Nevada.	26.	50.	Apr 16.	May 20.	C. E. Elliott.	309	Montgomery st.
Murchie M. Co.	California.	8.	15.	Mar 31.	May 9.	W. W. Letts Oliver.	309	Montgomery st.
Morgan M. Co.	California.	10.	60.	Feb 27.	Apr 7.	C. L. Tilden.	306	Market st.
Manhattan Bar M. Co.	California.	5.	15.	Mar 14.	Apr 18.	J. S. Jordan.	310	Pine st.
Ophir M. Co.	Nevada.	47.	50.	Mar 7.	Apr 11.	E. B. Holmes.	309	Montgomery st.
Pacific Sound Iron Co.	Washington.	7.	1.00.	Mar 12.	Apr 25.	A. Halsey.	328	Montgomery st.
Pedro Corro M. Co.	Arizona.	1.	6.	Feb 23.	Apr 29.	J. Stadplat.	419	California st.
Peerless M. Co.	Arizona.	1.	25.	Apr 8.	May 17.	J. G. Wells.	309	Montgomery st.
Rainbow G. M. Co.	California.	10.	10.	Apr 15.	May 16.	J. S. Jordan.	310	Pine st.
Savage M. Co.	Nevada.	23.	50.	Apr 5.	May 9.	E. M. Holmes.	309	Montgomery st.
Tilden M. Co.	Nevada.	3.	05.	Apr 15.	May 19.	C. V. Hubbard.	310	Pine st.
Union M. Co.	Nevada.	26.	1.00.	Mar 6.	Apr 6.	J. M. Pratt.	309	California st.
Utah S. M. Co.	Nevada.	48.	1.00.	Mar 21.	Apr 28.	M. T. C. Pratt.	309	Montgomery st.
Wildman M. Co.	California.	1.	25.	Feb 13.	Mar 28.	R. E. Elton.	310	Pine st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Con. Imperial M. Co.	Nevada.	J. E. Dean.	309 Montgomery st.	Annual.	May 7
Fair Play M. Co.	Nevada.	W. S. Bacon.	316 California st.	Annual.	May 5
Morgan M. Co.	Nevada.	C. L. Tilden.	306 Market st.	Annual.	May 3

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M. Co.	California.	D. C. Bates.	309 Montgomery st.	25.	May 15
Bodie Con M. Co.	California.	G. Sessions.	309 Montgomery st.	50.	Apr 5
Bulwer Con M. Co.	California.	W. Willis.	309 Montgomery st.	25.	Jan 23
Contention Con M. Co.	Arizona.	D. C. Bates.	309 Montgomery st.	25.	Jan 12
Deer Creek Blue Gravel M. Co.	California.	T. Wetzel.	522 Montgomery st.	10.	Mar 16
Idaho M. Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Apr 2
Jackson M. Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar 16
Kentuck M. Co.	Nevada.	J. W. Pew.	310 Pine st.	10.	Apr 15
Paradise Valley M. Co.	Nevada.	W. Letts Oliver.	328 Montgomery st.	10.	Apr 28
Standard Con M. Co.	California.	Wm. Willis.	309 Montgomery st.	25.	Mar 12
Syndicate M. Co.	California.	J. Stadplat.	419 California st.	10.	Mar 5

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 3.	WEEK ENDING APR. 10.	WEEK ENDING APR. 17.	WEEK ENDING APR. 24.
Alta.	1.45	1.55	1.50	1.55
Andes.	1.30	1.60	1.15	1.25
Argenta.	1.25	30	20	25
Belle Isle.	1.10	1.30	1.00	1.15
Belmont.	2.80	2.80	2.80	2.80
Bodie.	1.50	80	55	65
Bonanza King.	15	20	15	25
Bodie Con.	6.25	63	3.50	6.50
Bulwer.	30	30	30	35
Bodie Tunnel.	1.10	1.50	1.05	1.65
Bulwer.	1.10	1.50	1.05	1.65
California.	1.05	1.05	1.05	1.05
Challenge.	1.25	1.25	1.25	1.25
Champion.	1.15	1.35	1.10	1.25
Confidence.	1.15	1.15	1.15	1.15
Con. Imperial.	1.15	1.15	1.15	1.15
Con. Pacific.	1.35	40	15	45
Crown Point.	1.20	1.70	1.35	1.00
Day.	1.75	1.35	1.00	2.00
Eureka Con.	4.20	4.25	4.00	4.15
Eureka Tunnel.	30	30	30	30
Exchequer.	30	30	35	25
Grand Prize.	1.10	1.20	1.00	1.35
Gould & Curry.	1.10	1.20	1.00	1.35
Goodshaw.	1.25	1.05	1.05	1.15
Hale & Norcross.	2.45	1.40	1.15	1.10
Holmes.	2.50	4.75	2.30	3.00
Independence.	1.10	1.05	1.05	1.05
Julia.	15	15	25	20
Justice.	15	15	25	20
Martin White.	1.55	1.95	1.55	1.70
Mono.	1.55	1.95	1.55	1.70
Mexican.	1.45	1.60	1.20	1.40
N. M. Diabolo.	2.30	2.40	2.40	2.40
Northern Belle.	2.50	2.50	2.50	2.50
Nevada.	2.50	2.50	2.50	2.50
North Belle Isle.	1.10	1.01	1.00	1.05
Ophir.	1.00	1.60	1.75	1.10
Overman.	70	1.75	1.50	1.75
Potosi.	70	1.75	1.50	1.75
Pinal Con.	65	80	40	60
Savage.	65	80	40	60
Seg. Belcher.	2.00	2.55	1.85	2.30
Sierra Nevada.	2.00	2.55	1.85	2.30
Silver Hill.	30	30	30	30
Silver King.	30	30	30	30
Scorpion.	55	75	50	60
Syndicate.	55	75	50	60
Uta.	1.35	1.65	1.30	1.15
Union Con.	1.35	1.65	1.30	1.15
Uta.	1.35	1.65	1.30	1.15
Yellow Jacket.	1.95	2.40	1.95	2.15

Sales at San Francisco Stock Exchange

THURSDAY A. M., Apr. 24.	140	Union Con.	1.75
80 Alta.	1.05	AFTERNOON SESSION.	
50 Alpha.	1.10	200 Alta.	1.10
00 Bodie Con.	4.15	900 Bodie.	4.35
330 Belle Isle.	35c	800 Bulwer.	80c
245 Chollar.	80c	150 B. & Belcher.	1.35
50 Eureka Con.	4.60	50 Belcher.	1.15
200 Grand Prize.	30c	1000 Benton Con.	1.15
150 Gould & Curry.	1.10	70 Crown Point.	1.30
300 Hale & Nor.	1.05	20 Chollar.	90c
700 Justice.	20c	Eureka Con.	4.10
100 Mono.	30c	100 Gould & Curry.	1.15
220 Mexican.	95c	400 Goodshaw.	25c
150 N. Belle Is.	10c	100 Grand Prize.	25c
100 Ophir.	35c	275 Hale & Nor.	1.10
300 Overman.	20c	101 Holmes.	1.45
100 Sierra Nevada.	1.60	300 Mono.	35c
630 Savage.	25c	370 Ophir.	45c
60 Syndicate.	50c	50 Sierra Nevada.	1.60
350 Scorpion.	25c	575 Union.	1.75
750 Tigs.	15c		

IMPORTANT additions are being continually made in Woodward's Gardens. The grove walled with aquaria is constantly receiving up accessions of new fish and other marine life. The number of sections is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

THE Postoffice Department has issued orders establishing new offices in Arizona at Armer, Crittenden, Payson and Quijotoa.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, April 24, 1884.	
ANTIMONY—Per pound.	14 @
IRON—Glenbrook, ton.	25 50 @
Eglinton, ton.	24 50 @
American White Pig, ton.	— @
Oregon Pig, ton.	32 50 @
Clippert Gap, Nos. 1 to 4.	5 50 @
Rehmed Bar.	71 @
Horseshoes, keg.	5 50 @
Nail Rod.	71 @
Norway, according to thickness.	14 @
Steel—English Cast, B.	14 @
Black Diamond, ordinary sizes.	15 @
Machinery.	12 @
Co. Paper—Ingot.	22 @
Crackers' sizes.	33 @
Fire-box sheets.	17 @
Nails.	28 @
Bolt.	8 @
Old.	12 @
Cement, 100 lbs.	41 @
LEAD—Pig.	4 @
Bar.	6 @
Pipe.	7 @
Sheet.	8 @
Bot. discount 10% on 500 bags.	2 30 @
Buck, bag.	2 30 @
Chilled, do.	2 50 @
TIN PLATES—Charcoal.	6 00 @
Term.	5 50 @
Coke.	6 15 @
Australian.	21 50 @
I. C. Charcoal Roofing, 14x20.	6 25 @
ZINC—By the cask.	19 @
Sheet, 7x8 ft. 7 to 10 lb. less the cask.	9 @
N. L. S. Assorted sizes.	3 25 @
QUICKSILVER—By the flask.	34 @
Flasks, new.	1 05 @
F. As, old.	85 @

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

DUNHAM CARRIGAN & Co. have removed from the old quarters on Front St., where they have been so long, to a fine new building fronting on both Beale and Main Sts.—Nos. 18 and 24 on the latter. The building was specially constructed for the firm, and has been carefully designed to meet their requirements. Dunham, Carrigan & Co. have gradually increased their business to such an extent that removal to more roomy quarters was necessary; and they wisely concluded to build for themselves. The new structure is heavily built, and of fine architectural appearance. As soon as they are thoroughly settled in their new quarters we shall give a more detailed description of the building.

AN EASY BINDER.—A. T. Dewey's Patent Elastic Binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable, and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Publishing Co.'s journals, Harper's Weekly and Scientific American, 85 cents; postage 10 cents. Postpaid to subscribers of this paper, 50 cents. Send to this office for illustrated circular. Agents wanted.

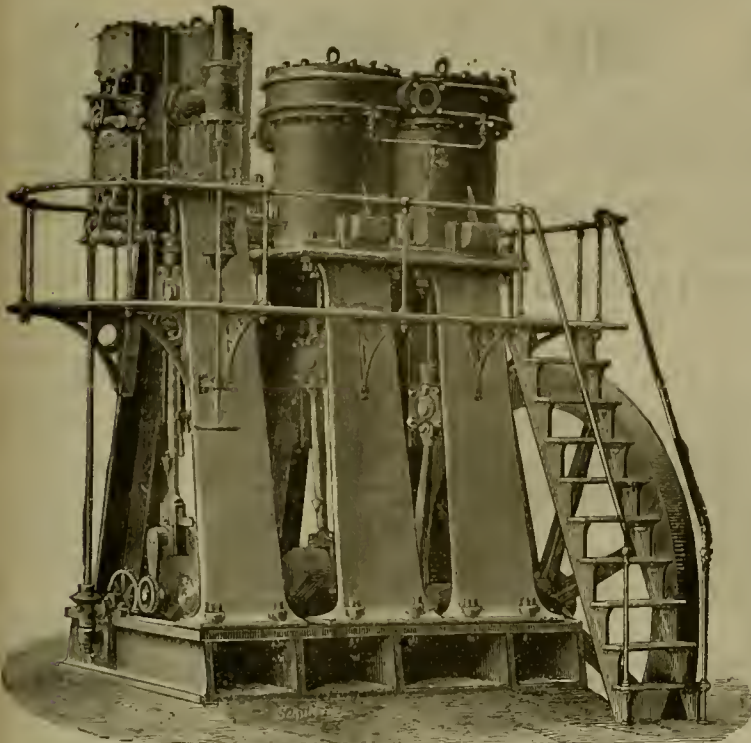
Intelligent Boy Wanted
To work in a photograph gallery. Satisfactory references required. Fourteen to eighteen years of age preferred. Wages moderate at first. A country lad or one who lives at home in the city preferred. Apply at this office.

JOHNSON'S Horse-power Diagram, \$2; Bourne Steam Engine, 1874, \$3; Hand Book Der Petre Fackenkunde, 2 vols., Atlas of Plates, 1,320 pages, 2,595 illustrations, \$8; Tubingen (Tunnel Building, German Text), Atlas and Text, Gatzschman Freyburg, \$2.50; Elements Analytical Mechanics, by Barlett, \$1.50; Amott's Elements of Physics, \$1.50; and 4,000 other books, at HEALY'S BOOKSTORE, 104 O'Farrell street, S. F.

Mining Share Market.

The stock market continues very dull. Hope long deferred has made many desert the halls of the Stock Board for more profitable occupations. On the Comstock they are still working away hopefully. In the Sierra Nevada the work of exploring the 300 level has been commenced. They are now cutting out for No. 2 crosscut at a point 123 ft north of No. 1. In cutting out some pretty fair ore is being exposed. This is at a point 203 ft north of the joint Union Con. winze. In crosscut No. 1, the greater part of the way, they had on one side a streak of quartz and ore that extended two-thirds of the way across the width of the drift. Where they discontinued, in order to put in the drill, this streak still continued, but was narrower and poorer. At the middle mines they are now getting their drains, tracks, switches, etc., in position on the 2800 level, and are about ready to begin prospecting in good shape. The Chollar folks are pushing the west drift from the Combination through their ground. This drift will be gradually turned south and will form the main line on the level from which to crosscut. They will now also be able to prospect economically in the Savage ground. The leading Gold Hill mines are taking out and shipping to the river mills the usual amount of ore. The indications are that there will be no scarcity of water in the Carson river during the coming summer.

Bullion Shipments.



With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

Mining Machinery Depot,

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SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

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W. E. CHAMBERLAIN, JR.

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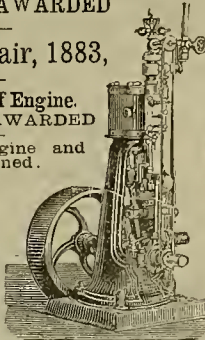
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Engine Works,

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Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First street, a Rutherford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. References as to above can be had upon applying to this office.

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Roofs
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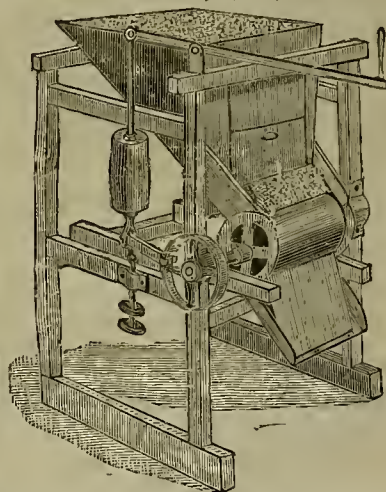
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Table of Contents:

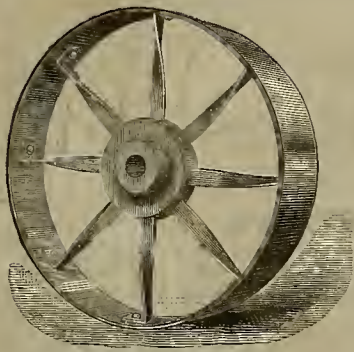
Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scoriafication; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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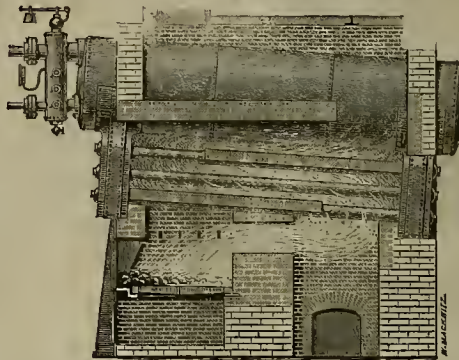
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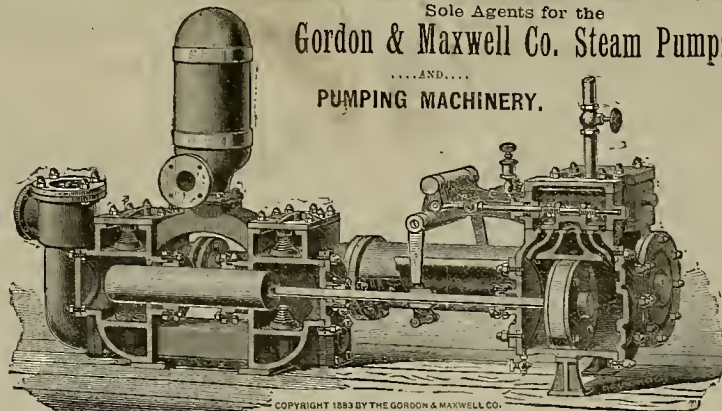
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fuel, grade and quality of bullion produced. We are
prepared to demonstrate by facts the claims here made.

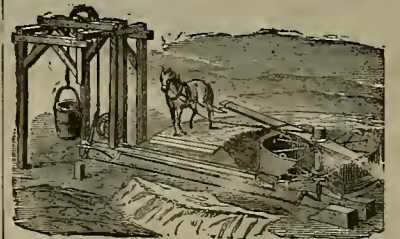
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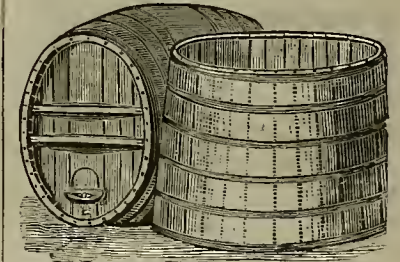
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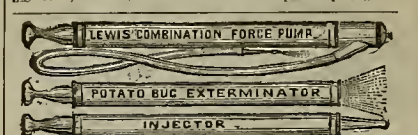


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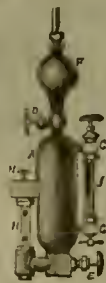
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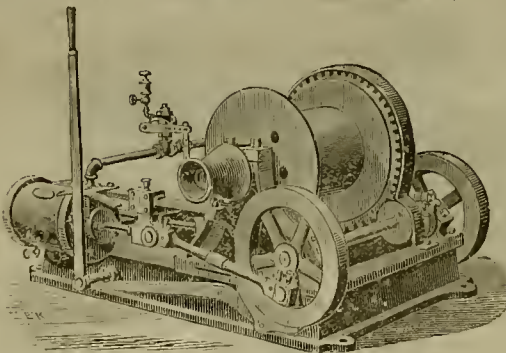
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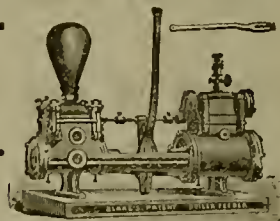
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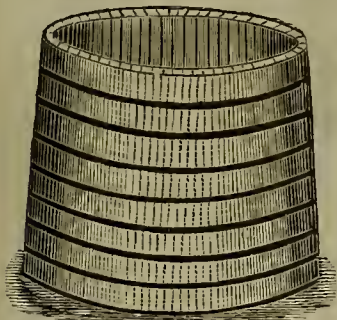
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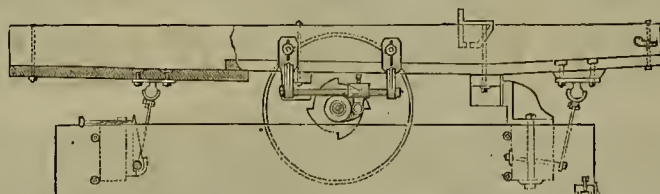
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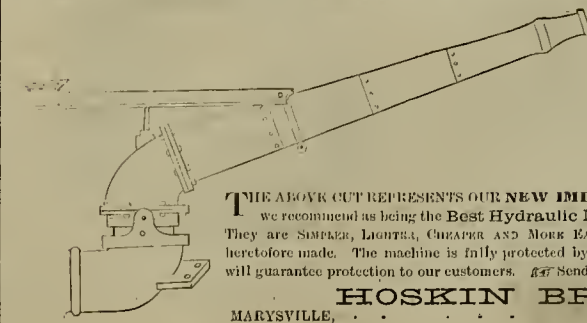
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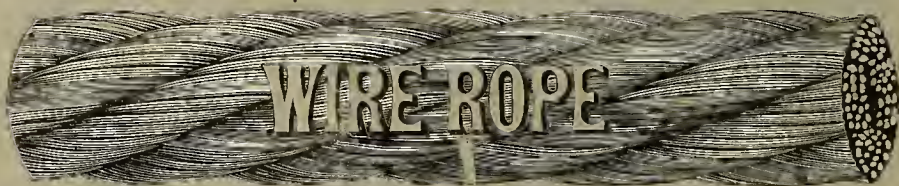
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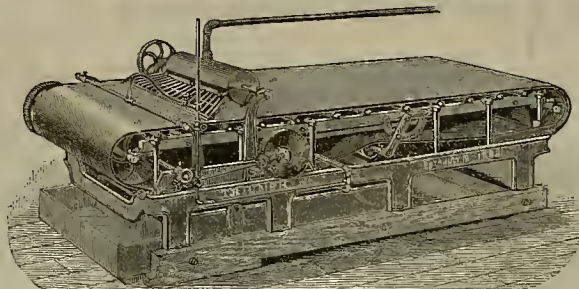
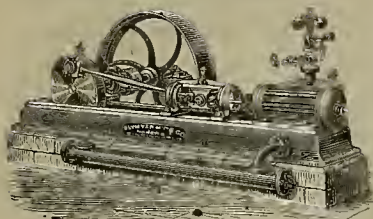
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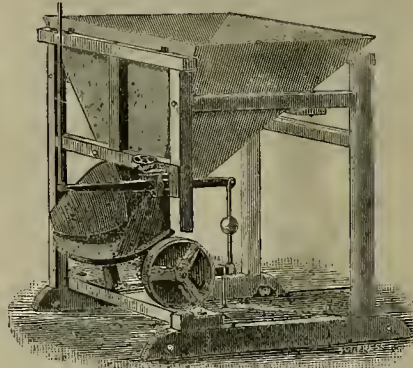
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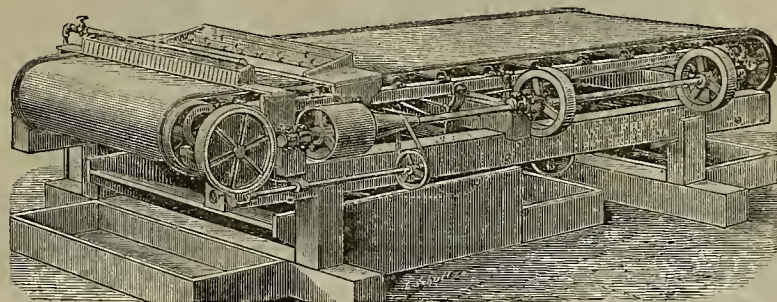
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HOT POLISHED SHAFTING, and P. BLAISDELL & CO.'S MACHINISTS' TOOLS.

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THE FRUE ORE CONCENTRATOR, OR VANNING MACHINE.

OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the office of Hinckley, Spiers & Hayes, No. 220 Fremont Street, San Francisco.

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That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company. That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

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January 3, 1884.

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SAN FRANCISCO.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, MAY 3, 1884.

VOLUME XLVIII
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Prospecting for Oil.

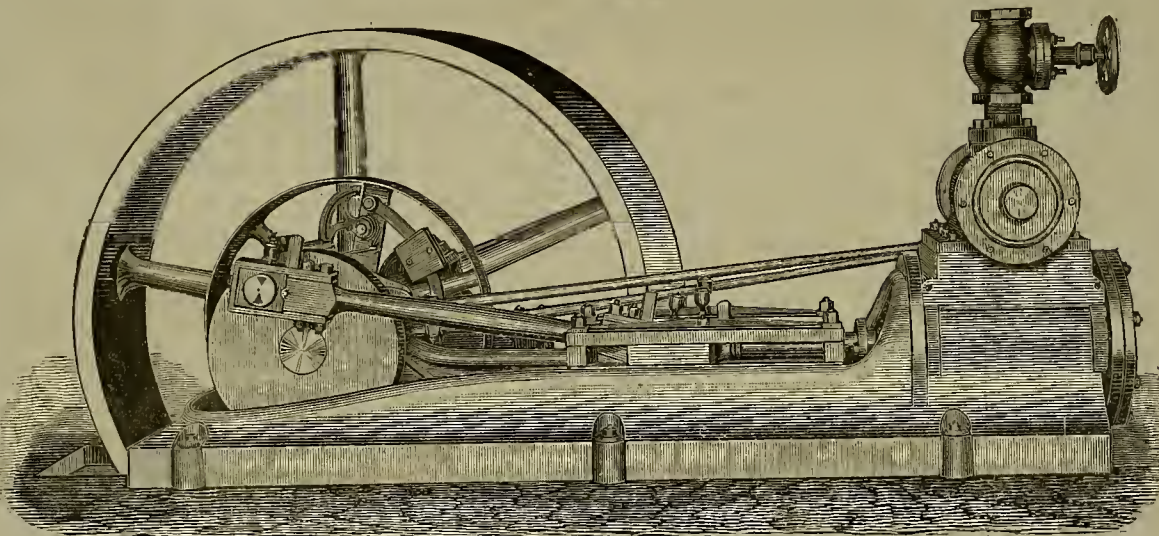
The circumstances which have governed oil operators in locating oil property have been many and various. Early in the history of the trade oil on the surface meant oil underneath. A location where oil was found on the surface of springs or streams, or oozing through the ground, was accepted as a favorable situation for drilling oil wells. The experience in the Pennsylvania oil regions, however, seems to prove the uncertainty of these indications. Wells were drilled in the vicinity of and in the bottom of the ancient pits on the famous Oil creek, in that State, without success. Wells have also been drilled in the immediate vicinity of oil springs, and have found no oil in any abundance. This experience would seem to prove that oil on or near the surface of the earth has but little immediate connection with the large deposits of petroleum from which the wells of the present draw their supplies. In the early years of the oil trade, in selecting a site for an oil well, a ravine or hollow was generally considered to offer advantages, possibly from some mistaken impression that the presence of the irregular and cavernous rock formation in which oil is found was indicated by the irregularity of the surfaces. There may be of course some connection, but a well so located would not be necessarily over the oil-producing rock. An erroneous impression also prevailed that locations in ravines or on river bottoms were good because the stratum of rock could be reached with less difficulty. Mr. S. H. Stowell, a very good authority on such matters, affirms that the facts are against all these theories, were there no other argument to be urged against them, and they have been proved erroneous by experience, the location of a well with regard to the surface configuration having been found to have but little to do with its productiveness.

The chief guide that for years has been, and is now, relied on in locating oil property, is the success or failure of former operations in the locality under consideration. Pioneers in new localities take most of the risks therefore. It having been once decided that the reservoir of oil is beneath one well, it is reasonable to conclude that another well, drilled in close proximity, stands a fair chance of tapping the same reservoir. Of course to this rule must be attributed, more than to any other, the development and increase of our oil fields. Still there are many instances where a well sunk in very close proximity to a producing well has failed of success. In one instance cited, a well which was quite dry at first became a producer upon having the diameter of its bore increased about an inch, proving that ever so slight a distance from the oil vein will be fatal to the productiveness of the well.

DR. ZEILE, owner of the Zeile quartz mill and mine in Amador county, died last week in Italy.

The Ohmen-Simmons Engine.

The engraving on this page represents the Ohmen-Simmons automatic balance valve cut-off engine. The engine is built in this city by W. H. Ohmen and has been patented by that gentleman and J. Simmons. The Ohmen engine has been well known on the market for some years, but this new type is a decided improvement, and the manufacturers now think they have the plainest and most perfect automatic cut-off engine in use. There are but two straight eccentric rods acting direct one on each valve, and one inside of the other. There is but one stuffing box to contend with on the whole engine, and that is the one for the piston rod. The engine however possesses all the good qualities of other first class cut-off engines. Being of a new form, new standard patterns had to be made, and these are now nearly all done.



THE OHMEN-SIMMONS AUTOMATIC BALANCE VALVE CUT-OFF ENGINE.

When accomplished two classes—"A" and "B"—will be made. Class "A" will be an engine of short stroke such as is shown in the engraving herewith. Class "B" will be a long stroke engine designed for high piston speed and not too many revolutions. Mr. Ohmen has up to this time completed three of this type of engines. One of them was for the Golden Age mills and is a 20 x 42, saving 33 per cent fuel over the old engine. One 16 x 18 has been built for the Sheridan mills; and one 8 x 9 for the United States Laundry. He has in course of construction one for F. P. McLennan's wool scouring factory, and one for Fry & Wiseman's flour mill. Mr. Ohmen says he is now prepared to build this engine from a 6 inch cylinder to one of a 30 inch bore.

THE Silverado Company, Sweetwater, which owns two locations on what is known as the Silverado lode, has four shafts sunk. In the main shaft on the Silverado claim a very rich strike was recently made. The ledge is about six feet wide and eighteen inches thick; yields ore which assays from \$1,200 to \$1,500. The remainder is good milling ore, which will work to about \$50 per ton.

COMMISSIONERS who have examined the twenty-five-mile branch of the Cascade division of the Northern Pacific railroad built east from Tacoma towards Natches Pass, found the road first-class, and will so report.

Methods of Working Breasts.

The places from which the coal is mined are known throughout the anthracite coal fields by the term breasts. But in some localities they are also often called rooms or chambers. The latter terms being applied to flat workings. In opening, ventilating and working breasts, they may be divided into three classes according to the dip of coal: 1. Wagon breasts; in coal dipping less than seven degrees. 2. Buggy breasts; in coal dipping from 6 or 7 to 10 or 12 degrees. 3. Shute breasts,—pitching breasts; in coal dipping from 12 or 15 to 90 degrees or vertically.

Wagon breasts or those into which the mine car is taken or a track laid from the gangway to the working face, admit of few variations in the method of working, and this is also true of buggy breasts; but there are several methods of

Samples for Analysis.

In selecting samples of ore, coal or other mineral substances for analysis, the object to be attained is to receive a sample fairly representing the average quality, not of hand specimens, but of the article to be shipped to the market. Take, for instance, the example of coal. When mining and shipping are already in progress the most approved plan is to take a considerable quantity (two or three shovels full) from a number of cars, or to gather it in buckets from the loading shute.

A large quantity having been thus collected, it is carefully broken down into smaller pieces, mixed thoroughly with a shovel, and thrown up in a conical heap. The heap is then quartered, and two quarters opposite each other thrown aside. The remainder is broken still finer, mixed, heaped up and quartered as before, and this process is repeated until only a few shovels full are left. This is packed and shipped to the chemist, the box or keg being covered with strong paper to prevent entrance of dirt and loss of some material. This matter is, of course, only intrusted to a disinterested material. If no coal has been mined, and the sample is to be taken from a drift tunnel or stope in the bed, a small piece should be broken from every inch of the seam, care being taken that the fragments shall be of equal amount from each part of the bed, so that they will make such a sample as would be obtained by cutting out a

block of coal three or four inches square and as high as the bed is thick. The parting bands of slate, sulphur (pyrites), etc., should always be included in the sample, unless the bed contains a thick layer of slate or bone that readily breaks loose from the coal and can be cleared from the coal in mining. In this case the parting may be represented in the sample by such a piece as would be taken if the parting were only a thin layer. As very few persons can be trusted with the selection of samples taken directly from a bed not mined, when work of this character is needed, and the analyses are to be used for any important purpose, a mining engineer accustomed to work of this kind should always be employed to gather the samples.

The first of the four large locomotives built for the Park and Ocean Railroad has been taken to the depot at the end of Haight street. From Twenty-fifth and Valencia streets the locomotive was drawn upon a truck to Haight and Market streets, and here a number of horses, four abreast, were hitched to the truck and the procession moved slowly out Haight street. There were forty-two horses in all drawing the locomotive, which weighs thirty-eight tons. The water for two or three trips is carried around the boiler. This has a double advantage—the water enters the boiler warm and requires less coal to heat it, and the weight of the water presses the driving-wheels to the rails and gives the engine greater power.

THE S. P. C. R. R. Company have received at Alameda Point three of their new locomotives and another is daily expected. A shipload of steel rails is being unloaded there, and will be laid on the new mole. An addition of about sixty miles of new steel rails will be laid from Alameda Point to Glenwood.

THE arbitrator to whom the question of wages in the manufactured iron trade in Northern England was referred, has decided upon a reduction amounting to 2½ per cent. The employers demanded a reduction of ten per cent.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

New Mexican Mills and Mines.

EDITORS PRESS:—A certain Territorial paper has lately published a list of reduction mills and plants in New Mexico, which is absurdly incorrect in many of its statements. In this immediate neighborhood it states that there are two 10-stamp mills at White Oaks and one 10 stamp mill at Nogal. In fact there are at this place one 10-stamp mill erected in June, 1881, which has been run spasmodically upon custom work; a new process, 60-ton mill of nondescript character, erected in 1882 for the Homestake mine, this never ran, and never will; and the "Delaware" gold mill, erected in 1883, equipped with one 20x9 crusher, Blake pattern, two Tasker pulverizers and two Embury concentrators. This mill ran on "Solitaire" and "Little Mac" ores for say three months, or until the "pulverizers" were worn out. It did fair work to an extent far below the estimated capacity. The pulverizers are not adapted to our hard and tough quartz. The two last are idle, and will remain so until rebuilt. The 10-stamp mill is working "Solitaire" ores, and will probably run continuously for the season of '84.

There is in Nogal canyon a fine 15-stamp mill, erected in 1883 to work ores of the "Rockford" lode. This is idle, pending litigation in regard to the mine.

In Dry gulch, one mile east of this last mill, is a fine 5-ton roller mill, with nickel patent pan, built by Gill & Lesnet for their "American Boy" lode. This has run continuously since its erection. There has been but one clean-up. Results: 743.75 ounces gold, \$55 fine.

Superintendent Sligh has just erected a 12-foot arastra at Vera Cruz, in Nogal district, to make a 100-ton test of ore from the Vera Cruz lode.

The New Mexican list makes no mention of the 5-stamp concentrating mill on the Cooney mine in the Mogollon mountains. The more strange, as it is so far the only successful concentrating mill in the Territory.

I will leave to others the task of pointing out errors in respect to other parts of the Territory. Last week I visited the "American Boy" lode in Dry Gulch, the property of Messrs. Gill & Lesnet. This lode was located by Mr. Gill in 1869. He held it for several years at the peril of his scalp. When the Mescalero Apache reservation was created it included the location of the mine, and Mr. Gill was driven off without the slightest warrant of law. Upon the reduction of the reservation in 1882, he resumed active development. This winter he and his partner erected a small roller mill; capacity, four tons in twenty four hours. The mine is under the direction of the owners, and they run their mill themselves. As stated elsewhere, they cleaned up after a run of 40 tons, and realized over \$13,000. About one-half of this was selected ore. They have exposed a vein 90 feet wide in granite walls, 60 feet is quartz, every inch of which prospects. Bands of from half an inch to a foot in width are strung with wire and shot gold, and pay from 10 cents to \$4 per pound. No great depth has been attained as yet, as until starting up their mill, the owners could not afford deep workings. As it is, and if there were no more of it than can be seen, the mine would be a wonder. I write of this property the more freely because it is not for sale.

It does not, however, stand alone in this district. There are others as good, or nearly so. This property will be equipped during the season of 1884 with a much larger mill. But even with the small one, it will be a noticeable producer. For the season of 1884 the gold production of Lincoln county will for the first time become of importance.

It could have reached a heavy production in 1882 had the mining machinery brought in been brought and controlled by men having knowledge and experience. The mill in Nogal canyon and the small mill in Dry gulch were the first erected in the county by a man of experience. The owner of the first mill built at this place has learned the art and mystery of milling gold ores, and now does good work, but he learned at a heavy expense to himself and the camp.

D. J. M. A. JEWETT.

White Oaks, N. M., April 18, 1884.

How to Survey a Bore-Hole.

In a paper read before the Victorian Institute of Surveyors last September by Mr. E. F. Macgeorge, there is an account of a system, devised by the author, for surveying and mapping the true direction of bore-holes.

Serious deviations from the vertical of bore-holes made by rock drills, have often caused much protracted and expensive search for mineral deposits proved by them, and have led to many suggestions for the discovery of such "lost bore-holes;" but to Mr. Macgeorge is due the credit of making this possible, by simple, and what seems an efficient method.

The surveying instrument, or "clinostat," is a cylinder of glass, six inches long, fitting into a brass jacket within a guiding tube geoscope. The lower end of the cylinder terminates in a short neck and glass bulb about one inch diameter, within which is a magnetic needle, semi-floating under a buoy, so as to stand upright upon its pivot. This bulb is filled with a hot

solution of gelatine which sets and holds the needle at its bearing.

Passing through an air tight stopping at the other end of the glass cylinder is a small glass tube, terminating in another bulb above, and containing a glass plummet with float, which, like the magnetic needle is immersed in the gelatine solidifying fluid.

"The fluid then contains within itself an automatic registration of the inclination and azimuth at which its containing vessel cooled, while, let us say, 500 feet deep in the bore-hole to be tested; and it is easy therefore after its withdrawal, to tilt it to the same angle and to the same quarter of the compass as before, by simply bringing the embedded plummet and needle to the vertical and northerly directions respectively."

The clinostats in the guide rod are six in number; and, as tests are taken at several points in the bore hole, great accuracy can be obtained.

Each clinostat, with its congealed contents, is now placed in succession in a recording instrument or clinometer, where by means of two cross visioned telescopes kept truly in the same plane at every angle of inclination by a parallel motion, the clinostat is brought to the same angle of inclination at which it set; and by a circular mirror below the needle bulb and into which is reflected the image of the needle, there is the means of plotting the angle of direction.

It is a well-known fact that bores frequently deviate from the plumb, and considerable error, even amounting to as much as 40 feet in a bore of 180 feet deep, has been observed. Mr. Macgeorge's ingenious device for surveying bores, which he states has in many instances saved large sums in hap-hazard mine driving through the hard rocks of the auriferous reef district of the Antipodes, might frequently be of value in our own mining operations.

Appeal to California Representatives.

To our Honorable Senators and Representatives from California in the Congress of the United States:

The Manufacturers' Association of California respectfully address you this memorial in relation to the present situation regarding patents for inventions, and earnestly invoke your active opposition to such bills as have been or hereafter may be introduced into either branch of the National Congress hostile to the progress of science and the useful arts, by limiting the just protection to their respective discoveries and appliances.

It is with surprise and fear that we have recently learned of bills greatly impairing, if not practically destroying, the rights heretofore conferred upon inventors, having been favorably considered by the House of Representatives, and we view with anxiety the action of the Honorable Senate upon them, and with alarm the consequences which may follow their enactment.

We consider the proposed changes radical and unjust, and liable to seriously injure many and great existing interests, and prevent completion of numerous prospective enterprises by withdrawal of capital and confidence, and raising perilous obstacles to our country's inventive, industrial and manufacturing progress.

We therefore earnestly and most respectfully protest against the proposed changes, and all similar provisions which abridge the usefulness of the Patent Office Department or impair the protection heretofore afforded.

In presenting this request and protest, we beg to remind you of some great facts of history which are a part of the common knowledge of the world, viz.:

That the general advance of each civilized nation in knowledge and intelligence, in enjoyment of increased comforts and luxuries and accumulation of wealth has been greatest where inventors are best protected, and that this advance is chiefly due to their discoveries and productions.

That the patent laws do not, nor have they ever given, the inventor anything beyond an exclusive right for limited time to use or sell that which he had himself created. For this reason the country has lost nothing nor can it lose anything by continuing the patent laws as wisely provided for in the Constitution of the United States, in all their force and integrity.

That the great inventions and useful discoveries made by inventors in the United States have constituted an advance highway on which our country marches, a proud leader of the nations of the world in all that makes a people intelligent, comfortable, rich, happy and independent.

That under the incentive and protection afforded to inventors by our patent laws, inventions and improvements have multiplied rapidly, furnishing easier and cheaper methods for agriculture, manufacturing, mining, transportation and travel.

That the hours of daily labor have been reduced, while the means of livelihood, with enlarged comfort in our homes, have been greatly increased through the changes these inventions have wrought.

The benefits derived by the country from inventive genius and mechanic skill, are so immeasurably greater than inventors have gained from the people, that comparison ceases.

Referring to these general truths, we send you this Memorial protesting against the threatening action inimical to the patent laws, and earnestly soliciting your hearty efforts towards continuing the wise policy which has

added so much toward the expansion, prosperity, strength and glory of our nation, and respectfully express our desire that you will exercise your influence to preserve the body and intent of our patent system, and that all changes will be confined to details for correction of abuses to make it more effective.

Manufacturer's Address to the People of California.

The "Manufacturers' Association of California" is an incorporation without capital stock, recently formed to promote manufacturing interests of this coast, by establishing more intimate and reciprocal relations between the various mechanical and other industries.

Its membership already embraces upwards of one hundred names, representing nearly every prominent manufacturing and laboring pursuit, engaging large capital and many thousand employees.

It is desired to extend this membership, to include every industrial and manufacturing interest, however small or remote, in the State; believing such combination will create new, and advance existing enterprises.

The special object being to stimulate and assist local production and manufacturing, by mutual encouragement, patronage and protection, thereby increasing the sources and means of employment for many thousands more of our people who wish and only wait opportunities to make their time and labor useful.

The growth within few years past of manufacturing business in this State has been exceptional, indicating that we have all the elements of self-support and preparing the way for new enterprises as population increases, and cultivation of the soil extends.

The progress hitherto made warrants the statement that products and manufactured articles of our State are equal and often superior to those from abroad.

A larger proportion of the articles consumed or appliances used here can be supplied from our own resources, if home labor is fostered by giving its products preference; thus capital will be encouraged toward factories, workshops, and raising raw material to be converted into food, clothing, fabrics, and implements constantly required.

The rapid extension of railroad connections with adjacent States and territories, their flowing population, and resources to be developed, together with increasing ship commerce, and demands for export, furnish new markets for products of our soil and manufactures, affording most encouraging promise.

The prospects of this year in grain, fruit, wine, wool, dairy and cattle districts are unusually favorable; whilst the constantly increasing value of our iron, leather, lumber and other industries adds new impetus to all contingent traffic.

Money paid for productive labor becomes now capital. In proportion as it is distributed among our people, conditions of self-reliance and self-support will improve, wealth accumulate, and all interests, whether of land, improvements, or the varied employments of floating capital, become secure and profitable.

In view of these facts we earnestly invite your co-operation, confident that harmonious action will promote common benefit by enlarging the field and variety of industrial occupations to the advantage and prosperity of all.

The influence of such an association, composed of many and great interests and varied industrial pursuits located throughout the State, by their numerous employees and dependants united upon a good purpose, will be an important factor in social and public welfare.

Let all assist by personal effort to develop and support local enterprises, that needed capital, now too often withheld, be attracted to them and secured in its investment; respectable remunerative trades and occupations afforded to those who seek employment, particularly the young of both sexes, so that industry and economy may flourish, and prosperity reach every part of our broad commonwealth.

The office of the Association is Room 43, Merchants Exchange No. 431 California Street, San Francisco, where the secretary will receive visitors and give necessary attention and information upon all matters relating to its business and purposes.

A. S. HALLIDIE, President.

IRVING M. SCOTT, Vice-President.

N. W. SPAULDING, Treasurer.

Geo. C. HICKOX, Secretary.

Directors—W. T. Garratt, Arpad Haraszthy, Isaac Hecht, Alanson H. Phelps, A. L. Tubbs, Wm. Harney, S. P. Taylor, David Kerr.

Importations of Nickel

The importations of nickel have varied greatly from year to year for the past five years, as shown by the annexed table. The steady increase in the amount of nickel oxide and alloy of nickel with copper from 8,518 pounds in the year 1878 to 177,822 pounds in 1882 is noticeable, and is due to the fact that a large part of the nickel imported is now entered as "alloy," while containing as high as 95 per cent of nickel and only 5 per cent of copper, being nearly as pure as the nickel of commerce made a few years ago before the discovery of the Nonneau ores. A compound of 50 parts of nickel and 50 parts of copper was then commercially known as nickel alloy. At present nickel is made, or can be made, commercially pure, carrying only 1 or 2 per cent, or even less, of impurity.

The following table shows the amount of

nickel, nickel alloy, etc. (including both entries for immediate consumption and withdrawals from warehouse for consumption), imported into the United States during the fiscal years specified:

Years.	Metallic nickel.		Nickel oxide and alloy of nickel with copper.	
	Quantity.	Value.	Quantity.	Value.
	Pounds.		Pounds.	
1878.....	7,486.50	\$8,837	8,518.00	\$7,847
1879.....	10,496.50	7,823	8,317.75	5,570
1880.....	33,276.00	25,758	61,880.00	40,311
1881.....	17,083.00	14,563	135,744.00	107,627
1882.....	22,006.00	17,924	177,822.00	125,736
Total.....	97,008.00	74,851	392,270.75	\$287,091

There were no importations of nickel ore at the port of New York during the Year 1882.

The so-called "nickel alloy" is made for the American market by the Vivians, of Swansea, England.

Iron Shaft Tubbing.

The rupture of the cast-iron tubbing of a shaft at the Banoux colliery, in the province of Liege, in Belgium, claims the earnest attention of mining engineers. The accident is striking, both from its novelty and from the fact that none of the universally adopted elements of security were absent. A committee of eminent engineers had designed the work, the quality of the material and workmanship was beyond question, and the directorate had even increased the dimensions recommended by the engineers.

The tubbing of the Banoux shaft was required to resist the pressure of 42 meters (139 feet) head of water. It extended from the thill of a coal seam up to a height of 44 meters, the distance to the surface being 60.5 meters; and it was composed in height of seventy-two sections of 0.60 meter each. This length of tubbing of 44 meters was divided into three equal portions, in which the thickness of the metal differed. In the lower portion, this thickness was 34 millimeters (1.33 inches); in the middle portion, it was designed to be 26 millimeters; and in the upper portion, 19 millimeters. But, during the execution of the work, these portions were increased to 30 and 26 millimeters respectively. The shaft was not circular, but four-sided, the sides being equal and curved, a form common on the continent. In this shaft, one segment was made to span the whole distance on each side. The segments on two opposite sides were curved to a radius of 3.85 meters (12.63 feet), giving a chord of 2.5 meters, and a versed sine of only 0.22 meter. On the other two opposite sides, the segments were curved to a radius of 3.50 meters, giving a chord of 2.60 meters, and a versed sine of 0.27 meter. The segments were bolted together at the angles in the usual manner, the joints being made with strips of lead 3 millimeters (0.118 inch) thick. On the inside of each segment, were three strengthening ribs, each 85 millimeters (3.34 inches) deep. It is customary to calculate the thickness of such tubbing on the assumption that the shaft is circular, and of a diameter corresponding to the curvature of the segments. Calculated on this basis, the thickness of the lower tubbing should have been, for the larger diameter, 32.34, say 33 millimeters, and for the smaller diameter 29.4, say 30 millimeters. The thickness actually given was 34 millimeters in both cases. Thus, the dimensions adopted were not only arrived at in the manner sanctioned by experience and in conformity with the common practice, but as an additional security, these dimensions were slightly exceeded. Thus, nothing was wanting to give confidence in the solidity of the structure. Yet this tubbing, calculated, as it was supposed, with a wide margin for safety, to resist a head of water of 42 meters, gave way when the head had reached only 35 meters. The rupture occurred in the middle of the segments, and extended from the bottom to a height of 18 meters through thirty-one successive segments.

The purpose of the author of this report is to show that tubbing of this character is not subjected solely to a stress of compression, as in the case of circular shafts; and that consequently the calculations which are based on that assumption are erroneous and dangerously misleading. He demonstrates that such segments are exposed to a transverse strain by the extraneous being forced outward against the pressure which holds the center in position—that is, the force which is brought to bear upon those pieces tends to cause flexure, and the strain thus set up increases with the radius of curvature. Such a strain tends to break the segment in the middle, in the manner in which the rupture occurred at Banoux. A careful measurement of some of the deformed segments showed that the versed sine had been diminished by from 1 to 2 centimeters, while their chords had been increased by from 2 to 4 centimeters. The author recommends the adoption of a greater thickness of iron in these cases, and suggests the necessity of taking precautions to counteract the tendency of the angles to yield under the action of the external pressure. In the new tubbing designed for the Banoux shaft, these suggestions have been acted upon, and the structure is probably the most massive that has yet been constructed.

Abstract of a paper by P. Banoux in *Annales des Travaux Publics de Belgique*.

MECHANICAL PROGRESS.

Rotary Engines.

Prof. R. H. Thurston, in a recently published communication, gives the following excellent summary of the comparative merits of the reciprocating and rotative types of the steam engine, which will be found of special value to those interested in the development of the latter type of engine. It is an admirable and concise *resumé* of the present status of the subject under discussion:

"Advantages have been expected of the rotary engine by the advocates of that form of motor which are not looked for by the well-informed engineer. It is assumed that the reciprocating engine is essentially defective; that the conversion of the reciprocating motion of the piston into the rotary motion of the crank and fly wheel involves, necessarily, some appreciable loss of power and efficiency; that the variation of speed of the reciprocating parts, from a state of rest at the 'dead points' to maximum velocity at half stroke, must necessarily cause loss of power, increased wear and tear, and dangerous impact at high speed, and must thus restrict, to a very serious extent, the development of greater power by the adoption of higher velocities of piston. It is these notions which have been the usual stimulus to inventors who have, during the past century, been endeavoring to produce rotary engines capable of competing successfully with the always standard reciprocating machine. The patent records teem with such devices, many of them ingenious, more of them crude and unmechanical. Rotary engines have usually proved to be wasteful in their use of steam, subject to rapid depreciation in power and efficiency, and to great loss of power by friction of working parts. Engineers are, therefore, likely to look with interest, and with a little surprise, upon a motor of this class which is not subject to these defects, even though it may not prove to be the superior of the best engines of the more common type.

"But the assumed objections to the reciprocating form of steam engine are, to a considerable extent, imaginary. The conversion of a reciprocating motion into rotation does not necessarily involve loss of power, and need not, in a good engine does not, cause objectionable jar or injury to the working parts. The limit to the increase of speed of the modern 'high-speed' engine is not beset by the difficulties of the kind above described met with in its operation, but rather by the impossibility of carrying more than a certain amount of power through fast-running machinery with absolute certainty that lubrication may be secured, without interruption for an instant, day after day, indefinitely. The inertia of parts, which has been so generally assumed to be detrimental to the action of the machine, has an equilibrating effect with the irregularity of steam distribution due to the expansion of the steam; and this balance may be adjusted for speeds greatly exceeding even the highest attained by the most radical of the high-speed engine builders of the day. The rotary engine has not, therefore, the advantage in this respect claimed for it in the past by many engineers, as well as by non-professionals. It has, however, evident advantages which have been hitherto more than compensated for by the apparent impossibility of securing that economical distribution of steam which is easily and satisfactorily obtained in the standard forms of engine, and by the failure of nearly every form of rotary, in competition with the reciprocating engine, when compared with respect to freedom from internal friction and leakage of steam past the piston. It is always safe for the layman, when asked to put his capital into rotary engines, to assume that the machine possesses these defects to a fatal extent, unless the contrary has been proved to be the case by careful tests made by engineers of known skill and integrity.

"The engineer is, therefore, pleasantly surprised when he finds one of this class of engines doing good work, and he will be still more pleasantly surprised when he finds the difficulties overcome which have hitherto been met in the endeavor to secure good steam distribution, high economy and perfect regulation, such as is seen in the best reciprocating engines, combined with the undeniable special advantages of the rotary engine. These impediments being removed, the rotary will supersede the reciprocating engine—but, I think, not till then, except for very small powers. Our small reciprocating engines do not compare favorably with larger sizes, in respect either to economy, exactness of regulation, or power per pound of weight of machine. They are usually capable of great improvement; but a small machine of this class will probably never do as good work as a large one. For the present, at least, the best rotary engines must compete solely with the smaller reciprocating engines."

Improvements in Men and Machines.

It would be a curious study to ascertain how far the improvement in machines and in tools had kept pace with that in the skilled mechanic. One thing is certain, at the beginning of the inquiry, that a skilled mechanic is of just as much value to-day as ever. How much he has improved is a question for scientific examination rather than one for absolute statement. It would be a queer assertion that the men of fifty years ago were inferior to those of the

present. All the facts of the past, as well as those of the present, show that our present mechanics are no more mechanics than those of half a century ago. All the great improvements in hand tools and machine tools for the last fifty years have come from the individual efforts of men who have done their work before the present advent of machine and automatic tools. These men—these workmen and inventors—made possibilities out of suggestions, and realities out of imaginings. To them belong the realities of the present machine shop.

It would seem from this that it is not the tools and the appliances that make the workmen, but the workmen who make the tools. There are just as good mechanics to-day, with all our mechanical appliances for good work, as there were when every job required a new arrangement of tools for work. In fact, the improvement in machines presupposes the capacity of the machine makers.

And yet these improvements have their influence on the workman; the better the tool, the more effective the workman. There are gray headed, almost superannuated, workmen in our shops who have voluntarily discarded all their old time notions to take up with some "new fangled trick" that has been proved to be an advance toward perfection. Every improvement in tools—induced and perfected by mechanics—tends to an advance in the true mechanical improvement of the workman.—*Scientific American*.

Old Castings.

The art of casting in metals is so dependent on the clay model from which the mold is obtained that it might almost be assumed *a priori* that improvement in plastic art would necessarily lead to a great development of metallurgical skill, and accordingly we find two celebrated Samian artists, Theodorus and Rheucus, credited with the invention of casting in bronze at a date probably not many years distant from that of Butades. When ancient writers speak of casting in metal as the invention of the two Samian artists, we must understand by this statement that improved kind of casting in which the metal is poured between the mold and a central bore, and which is called hollow casting, in contra-distinction to the more primitive process in which the molten metal entirely fills the mold, and which is therefore called solid casting. We know that this clumsy solid casting was familiar to the Egyptians, the Phœnicians, and the Assyrians centuries before the time of Theodorus, and we find it used for the handles of large bronze craters in Mycenaean tombs, and in small figures such as are found in the lowest stratum of the soil at Olympia. It was, however, unsuitable for statues on a large scale on account of its great weight and cost; therefore, it was that most Greek statues in bronze were originally made in separate pieces of metal hammered out on a mold, and then nailed together on a wooden core. Such figures, called *Sphyrelata*, or hammered work, were still extant in Greek temples in the time of Pausanias.

The invention attributed to Theodorus and his brother substituted for this primitive kind of metallurgy an easier and surer process, which after having been brought to an extreme perfection by the Greeks, has been handed down to modern times with little, if any, improvement in its technical processes.

STEAM ENGINE PRACTICE.—The introduction of "high-speed" engines in machine shops and iron and other metal manufacturing establishments is not satisfactory. There are places where the rapidly running engines, with a piston speed of 600 or more feet per minute, are at home, but their proper place is not the machine shop, if reports and facts agree. One of the largest and best known manufactories of metal goods in New England ran its works satisfactorily with a slow moving engine. To accommodate additional demands, the cylinder was re-bored and other changes made that added largely to the capacity of the engine. Except for this enlargement the engine required no doctoring, and before and after the change could be relied upon to do its work. An addition to the works was made three years ago, and a little buzzing engine put in to run it. The claim was made that the little wasp had more power than the old-fashioned traveler. But the result comes in frequent repairs and inconvenient stoppages, \$600 having been expended in repairs on the rapid moving engine within two years—four times as much as has been expended on the old engine, that has run evenly for 18 years. There are slow moving engines of 30 years ago or more in the New England States, huilt, some of them, by concerns now out of existence, and bearing the names of men on their claim plates who have "gone over" and left only their memories as mechanics, which do their work as honestly as some of the machines that to-day assume to displace them. They were built for their work, and not to illustrate a theory.—*Scientific American*.

MASSIVE STEEL FORGINGS.—Sir Joseph Whitworth & Co., of Manchester, have just completed several large steel forgings, made from their patent fluid-pressed steel. One of these is a solid forging, which is to form the tube or barrel for a 63-ton gun; the length of this forging is 34 feet 7 inches, and the greatest diameter 29 inches. In the rough it weighed about 31 tons, and finished for boring, 28 tons,

SCIENTIFIC PROGRESS.

An Oil Spot in the Gulf of Mexico.

Lieutenant Stamm, of the revenue cutter Andrew Johnson, recently gave the following description of a remarkable "oil spot" in the Gulf of Mexico, about which there has been much discussion among scientists recently. The facts in connection with this locality are wonderfully corroborative of the claim set up for stilling the sea waves, by the artificial application of oil to the surface of the sea. Lieutenant Stamm describes the "spot" as follows:

"The oil spot is situated about ten miles south of Sabine Pass, into which flows the Sabine river to the Gulf of Mexico, and it extends two miles along shore, and seaward about three-quarters of a mile. There is nothing remarkable about its appearance during calm weather, but in a gale, when riled, it assumes a reddish hue and is thick and muddy. The greatest depth, where comparative quietude reigns while the elements are at war is 12 feet, so none but vessels of moderate draft can enter. I have, with very little effort, from one of the ship's boats pushed a pole thirty feet in length down into the soft stratum. A storm from the northeast, by way of east to southeast, has a rake of from 300 to 700 miles across the Gulf of Mexico into this mystic haven. During a gale the spot is wonderfully defined. Looking seaward the scene is grand. An acre of towering foam marks the abrupt dissolution of the lashing seas as they thunder toward the shore. This occurs in about three fathoms, or eighteen feet of water, from which the storm-driven craft, creaking and straining in every timber, emerges and suddenly finds herself reposing like a child rocked in its mother's arms, hemmed in by a wall of wrath, where the weary mariner can be lulled to rest by the roar of the winds. I have frequently seen the decks of the vessel scrubbed with the mud from this spot. It is soapy, and its cleansing properties remarkable. There are no streams in the locality emptying into the Gulf, and the mud of the Sabine river to the northward contains none of the properties here found. If there is oil, it comes from the bottom surface. The place is termed the 'oil spot,' not from any known analysis of its nature, but simply from its condition; it has no troubled water. During three-fourths of the year the neighborhood of the oil spot is the Olympus of the mosquito."

The Science of Thinking.

The object of the teacher is to teach to think. The pupil thinks enough, but he thinks loosely, incoherently, indefinitely and vaguely. He expends power enough on his mental work, but it is poorly applied. The teacher points out to him these indefinite or incoherent results, and demands logical statements of him. Here is the positive advantage the teacher is to the pupil.

Let us suppose two pupils are studying the same lesson in geography or grammar or history. One reads to get the facts; he fastens his eye on the page and his mind to the subject before him; he makes the book a study, and acquires information from it; his object is to acquire knowledge. He attains this end. The other also studies the book, but while reading he is obtaining lessons in thinking. He does not merely commit to memory; he stops to see if the argument is sound; he analyzes it to see if the conclusion is warranted by the premises.

The one who thinks as he reads is quite different, it will be seen, from him who simply learns as he reads. To read and think, or to think as one reads, is the end to seek. To teach to think is then the art of the teacher. The reader for facts gets facts; he comes to the recitation seat and recells those facts. His mind, like Edison's phonograph, gives back just what it received. While this power is valuable, it is not the power the world wants.

The teacher will find his pupils come to the recitation to transmit the facts they have gained. He must put them in quite another frame of mind. Instead of recitations, they must be made into thinkers. The value of the teacher is measured by his power to teach the art of thinking.—*Teacher's Institute*.

LATE OBSERVATION ON THE PLANET JUPITER.—Among the papers read before the recent meeting of the American Association for the Advancement of Science, was one upon the planet Jupiter, by G. W. Hough, of Chicago, in which he remarked that the rapid motion of revolution of the planets, by changing the positions of the markings on the surface to our line of sight, makes great apparent differences in their shapes and sizes. This has perhaps been the occasion of reports of sudden and great changes upon the surface. The changes are not sudden, but are gradual, and many of the features are permanent. Minor changes are constantly in progress in the equatorial belts. The author recently observed the belt drifting down toward the red spot, but, although it partly surrounded it, they did not coalesce, and the spot forced a scollop into the belt—a very curious phenomenon. The author saw a satellite pass over this red spot, though the satellites are not visible when on the white part of the disk. He had also had a chance to compare shadows of satellites on the disk and on the spot, and both are dark. The red spot had

seemingly retrograded during the past four years; that is to say the rotation of Jupiter has seemingly increased from 9 h. 55 m. 33 s. to 9 h. 55 m. 38 s. The future observer should attend more carefully to what he sees, and theorize afterward.

THE MATRIX OF THE DIAMOND.—Until the South African mines were discovered the diamond was always found in sands and gravels, different from the mineral in which it was believed to be formed. At Griqualand West, however, the consolidated eruptive mud of the mines was believed by some to be the true matrix of the diamond; but opinions differed on the question, and arguments were found on both sides. M. Chaper, a French geologist, has, however, during a scientific mission to Hindostan, succeeded in finding the diamond in it, mother rock. At Naizam, near Bellary, in the Madras Presidency, M. Chaper has found the diamond in a matrix of rose pegmatite, where it is associated with corundum. The tract of country is almost denuded of trees, bare and rocky, and the rains wasting the rocks, every year expose fresh diamonds in the soil. The rock is traversed by veins of feldspar and epidiotiferous quartz. Here the diamond is always found, associated with epidiotiferous rose pegmatite. The diamond crystals observed are octahedral, but less distinct in line than the stones of South Africa, which seem to have been formed in a freer matrix. It follows from M. Chaper's discovery that diamonds may exist in all rocks arising from the destruction or erosion of pegmatite, for example, in quartzites with or without mica, clays, pudding stones, etc.

ASSERTED CHANGES ON THE MOON.—An eastern astronomer claims to have discovered within a few weeks past that something unusual is going on in the great peak of Tycho Brahe, a high mountain which has always been a prominent object on the eastern side of the moon. Tycho is a volcanic crater nearly 20,000 feet high and fifty miles in diameter, and it had up to within a few days a peak a mile high standing in this crater. This peak, which was only a bright spot in the midst of a black crater, it is asserted has suddenly grown to be a gigantic mountain nearly filling the entire basin of the crater and towering above every other mountain in the moon. It is estimated now to be thrice as high as it was, and promises some startling phenomena. The signs of a renewal of volcanic action in the moon began to be discovered nearly a century ago; but as yet no announcement of that kind has been verified by careful after examination, and the general opening among Scientists is that the moon is really a dead globe, and that no further changes will ever be observed on its surface.

SELENETROPISM.—Ducharte was led, by the influence which a light of very feeble intensity exercises upon heliopic movements, to vary the experiments by using moonlight. He sowed seeds of plants which were very sensitive to light, such as *Lens esculenta*, *Erym lens*, *Vicia sativa*. When the plants were a few centimeters in length, he put them in a dark place, where he kept them until the night of the experiment. The stalks became slender, long and white; the leaves developed slightly, with a light yellowish tinge. On three successive nights when the sky was exceptionally clear, the plants were placed behind a large window with a southern exposure, so that they received the direct light of the moon from 9 p. m. to 3 a. m. From the very beginning of the exposure the stalks began to head, so as constantly to present their concavity and the terminal leaf bud to the moon, following it in its course.—*Comptes Rendus*.

A LONG-DISTANCE TELEPHONE.—Mr. Webster Gillett, of Ypsilanti, Mich., claims to have solved the problem of adding battery to line almost without limit, and to have overcome the difficulty hitherto experienced in using a telephone over great distances. This he does by utilizing a number of independent local batteries, induction coils and deviating points simultaneously. If the number of cells of the battery could be increased without limit, and still not burn the low conducting medium, Mr. Gillett says, it would be possible to speak at almost any distance with an ordinary telephone. His system, he claims, overcomes this obstacle to the use of many cells.

ANALYSIS OF CHROME IRON ORES.—The insolubility and infusibility of chromic iron render its analysis one of the most tedious. Schwarz recommends smelting the finely pulverized mineral with chlorate of potash and caustic potash in a silver crucible. The fused mass is dissolved in water, and the quantity of potassic chromate estimated by running in a solution of ferrous sulphate, then titrating the excess of the latter with permanganate solution. The residue insoluble in water is dissolved in hydrochloric acid, and the iron titrated with stannous chloride. A good silver crucible will stand 100 fusions.

MICROBES are those microscopic plants which abound everywhere and cause disease and decay. They include the germs of disease in whatever form they exist, and the spores of the plant as well as its perfect form. The germs which cause cholera, measles, diphtheria, etc., are microbes, and so are those which cause an apple to rot, a can of peaches to mold, a barrel of cider to turn sour. It includes every form of bacteria and micrococci.



A. T. DEWEY.

W. B. EWER.

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Passing Events.

From all parts of the higher mountainous regions come accounts of the opening of spring, and in many localities which have been locked up for months the miners are now going to work. The prospectors who have been waiting so long for a chance to begin their labors are now roaming the hills and now we shall hear of the usual "spring strikes."

The Comr d'Alene rush still continues. Thousands of men are going up to these new Idaho mines. The accounts from there vary greatly. In our mining summary will be found the latest news from the region.

May has opened warm and pleasant and there is promise of a prosperous year in California.

The American Minister in Mexico has forwarded to the Department of State a copy of a decree issued by the President of the Republic, ordering that on and after May 15th the duty on all goods imported to that country be increased 5 per cent.

BUTTE receives and ships more freight than any ten towns on the line of the Northern Pacific Railroad between Portland and St. Paul.

The Anaconda Company last month paid out \$40,000 for wages and supplies at the smelter, in Deer Lodge county, Montana.

Mining and Scientific Press.

There is no paper in the country which gives such complete attention to mining of the precious metals and mechanical matters in all their details as the MINING AND SCIENTIFIC PRESS. It has been published almost since its inception by its present proprietors, who know the wants of the constituency that they serve, a fact abundantly proven by their business success. A few weeks since they concluded that the time had arrived when they could consistently lower the price of annual subscription to \$3 from the long-standing one of \$4. In doing this they look to their reward in an increased subscription list. This is proving correct, for the circle of readers of the PRESS is decidedly increasing.

Those of our old readers to whom the thought occurs will do us a favor by mentioning this reduction in price to others who they think would be interested in such a publication. To many persons the difference of a dollar in the yearly subscriptions would deter them from becoming regular readers. Now they can be assured that they will not be able to find a better cheaper or finer paper anywhere. All the departments are carefully edited and in them will be found all the current news and information of use to our readers.

We have a large list of subscribers among the hardy prospectors and miners of this coast, to many of whom the PRESS has been a weekly visitor for years. They appreciate and like the paper, feeling that they will always find in every issue something of value to them in their every-day work. We have endeavored to gather all that is practical for the use of our readers, and have avoided taking up space with mere scientific theories or idle speculations. What we give our readers we intend to be useful to them. We hope to keep all our old subscribers and add many more this year, and will improve the PRESS as opportunity admits. To do this to the extent desired by the publishers we need the co-operative assistance of all who are now on our list, and thousands more who would find it profitable to read the PRESS, and who may soon become its patrons if, their attention is properly called to it by its old friends and readers who have already enjoyed its advantages.

Foundry Notes.

At the Dow Steam Pump Works, in this city, they have just completed and shipped a patent differential compound plunger pumping engine of an entirely new pattern. It was made for the Spring Hill Water Company of Seattle, W. T. The pump weighs 25 tons, and is 25 feet long. The bed is very heavy, and is made in two sections. The diameter of the high pressure cylinder is 18 inches, the low pressure cylinder 36 inches, and diameter of plunger 16 inches; the length of the stroke is 36 inches. The capacity of the pump is 1,500,000 gallons in 24 hours; static head 350 feet.

This pump was made from designs by Mr. Dow. The details of valve motion are the subject of a patent now pending. The peculiarities are in the controlling action on the engine; that is, in its regulating the speed of the engine as well as in holding it against any appreciable increases of speed if anything gives way.

This is really a new departure in this line here—building anything of this class which is both of home design and home production. There have been mining pumps, but for a compound direct-acting pump, with self-acting valve motion of novel construction, this is the first effort of any magnitude. The general design is quite new, and the form strong and compact.

Mr. Dow is about introducing another novelty in the shape of an independent air pump and condenser, one of which, by the way, goes with the pump we have been describing. The use of this makes the large pump a compound condensing one. Being independent, it is applicable to any engine which they may want to turn from a high pressure or compound into a compound condensing one. Mr. Dow is going to introduce this as fast as he can here. The air pump is driven directly by a steam cylinder, independent from the main engine. The condenser is attached to and directly above the pump. The exhaust from the engine is led to this condenser above the pump.

The peculiar advantages of this are in being able to run the air pump independent of the main engine as well as creating a vacuum before starting the main engine. It is independent in its action all through. There is a good field for an appliance of this kind.

A New Treasure Vault.

At the U. S. Sub-Treasury in this city some work has just been completed of a character which reflects credit on our California mechanics. This is the new vault and door which has been made by the Phoenix Iron Works (E. A. Rix), of this city. The vault is 20 feet long, 10 feet deep and 8 feet high. The iron plates are three-eighths of an inch thick, all planed, fitted and screwed strongly together. The foundation of the vault is made of Ransome patent concrete, and through this is a network of electrical wires, so arranged that should one of them be cut an alarm will ring. As the concrete is as hard as the hardest stone, it would be impossible to cut through without breaking the stone and cutting or breaking some of the wires. The main feature of the whole, however, is the door, which is as fine a piece of mechanical work as has been done in this city. The neck and door weigh 5,500 pounds, the door itself weighing a ton. It is two and a quarter inches thick, and is composed of four plates of iron, two plates of steel, and two of welded iron and steel. This latter is called "iron-center steel." A sheet of iron is placed between two plates of steel, and is then passed through the rolls. The iron in the center prevents the steel from cracking when it hardens. The plates for the neck and door are fastened together with conical steel-headed bolts.

There is a Sargent time lock and one of Kitzredges best combination locks for the door. The time lock is so arranged that in case of breakage of the works, they can be operated by electricity until the time for the clock-work to release the bolt. The bolts and usual bright portions are nickel plated, and the whole finish is very ornamental. This is the first job of iron work for the Treasury done in this city. Assistant Treasurer N. W. Spaulding, who is a mechanic himself and can appreciate good work, is abundantly satisfied with this job, knowing it will compare favorably with that done by mechanics anywhere. Most of the work of this character has heretofore been done in Boston.

Another vault just like this is now being done by these Works for the Los Angeles bank and two or three more are promised. Mr. Rix's work has been highly commended by all those who have seen it. The fitting of the joints and the general workmanship is very creditable. By the way, it may be mentioned as a matter of interest that the representative of the PRESS who went to see this vault had the pleasure of seeing a pile of silver in bags amounting to twenty-four million dollars; and a pile of gold which summed up the magnificent amount of forty-six millions of dollars. Besides this there were ten millions of dollars worth of gold certificates and other such trifles which made up an aggregate of about eighty-six millions of dollars. Mr. Rix's new vault was necessary to hold more of the wealth that is coming in.

The Patton Concentrator.

The Patton concentrator has been very much improved of late, and is operated by a new motion. The machine is quite simple, and cannot get out of order easily, so that any one may set it up and run it. Mr. Patton has some 25 of them at work in various places, and he says they are giving satisfaction. There is this peculiarity about this machine. It saves all the floured quicksilver and any amalgam that may escape from the battery separate from the concentrations. This is done by a copper plate on the bottom.

When the stuff comes on to the machine it is three-quarters of an inch lower than the sulphuret discharge. This means the inventor gets the amalgam and sulphurets separate. The sulphurets discharge at the lower end, tailings at the lower end, and mercury and amalgam are held on the plate. Mr. Patton is building these concentrators at the Etna works, in this city, and those who may desire to see one in operation should call on him. The cut in our advertising columns shows the form of the concentrator. It only weighs 600 pounds, and is easily transported. Some of those who have used them say they will pay for themselves in quicksilver alone, even if there are no sulphurets in the ore. The motion of the machine is very much like that of an ordinary miner's pan.

The flow of water from the Suto Tunnel is 49,683,800 standard gallons per day.

Cost of Mining Copper.

The cost of mining copper ore of course comes within wide limits, the fluctuations being due to price of labor, nature of the ground, and, above all, to the outlay for prospecting and dead work, growing, as it does, at a rapid rate when large blocks of unproductive ground are traversed. The introduction of high explosives and power drilling machinery has not alone cheapened the cost of dead work and ore extraction, but has also rendered it possible to do more rapid work. The Lake Superior region is the center of the copper mining industry in this country. The managers of the Atlantic mine there estimate that, with drills, six men can stope 60 fathoms per month, at a cost of \$10, while with the same number of men by hand work only 25 to 27 fathoms can be stoped, at a cost of \$17.

At the Copper Falls the cost for drifting with power drills per foot was \$9.08, against \$10.33 by hand; for sinking, \$10.86 and \$11.65 respectively; and for stoping, per fathom, \$13.99 and \$14 respectively. According to a statement made by the officers of the Conglomerate Mining Co., the total cost of drifting by hand is \$11.43 per foot, while it is \$11.17 per foot by drills, drifts opened by the latter, however, being carried along in larger dimensions, so that when passing through copper-bearing ground there is an additional advantage of \$1.80 per foot, not counting the fact that in power drilling the advance is more than twice as fast as in hand drilling. The cost of hoisting, breaking, selecting, etc., has been decreased by handling large quantities. The following figures of the cost of treatment of rock (exclusive of mining and surface expenses) in different mines at various periods will aid in forming an estimate of the capacity of Lake Superior mines to produce copper cheaply:

MINE.	Years.	Quantity of ore treated.	Cost of breaking, hoisting, stamping, washing, etc., per ton.
Copper Falls.....	1862	19,752	\$1.12
Allouez.....	1881	63,362	1.07
Allouez.....	1882	97,232	.98
Atlantic.....	1875	100,000	.93
Atlantic.....	1881	176,055	.48
Atlantic.....	1882	139,800	.42
Quincy.....	1870	55,027	2.15
Quincy.....	1880	84,426	.79
Oscoda.....	1881	160,880	.92
Central.....	1881	20,549	.72
Central.....	1882	18,639	.88

The cost of transportation to the smelting works varies with locality. Lake freight to Detroit is from \$3.50 to \$4 per ton. The charge for refining is about \$11 per ton. The bulk of the copper is shipped by water to Buffalo, and by rail to Eastern markets, at from \$6 to \$8 per ton of 2,000 pounds.

At the Globe copper mine, in Arizona, the cost of production is from 9 to 9.25 cents per pound. It is thought that the Calumet & Hecla (Lake Superior) can lay down copper at the railroad for 7 cents per pound. The following table will be of interest as showing the cost of Lake Superior copper produced in 1882, when full details were obtainable. The figures, by the way, show a reduction in cost from previous years.

MINE.	Product in 1882.	Cost of production—cts. per lb.	Per ct.
Quincy.....	5,685,796	9.50	3.21
Oscoda.....	4,176,782	12.97	...
Atlantic.....	2,631,708	13.80	0.69
Central.....	1,353,557	14.76	2.20
Allouez.....	1,683,557	15.04	0.87
Franklin.....	3,264,120	13.00	1.10
Pewabic.....	1,482,665	17.00	1.00

ECLECTIC MANUAL OF PHONOGRAPHY.—Elias Longley, of Cincinnati, Ohio, has issued a new work with this title, for the price of seventy-five cents. The demand for short-hand writers is increasing, as they are being employed in railroad offices, insurance offices and various branches of business. The new manual is intended for the use of all desirous of acquiring the art of writing short-hand rapidly.

SUPERINTENDENT McALLISTER, who has had charge of the Auburn mine, near Dun Glen, for a year past, has been called East to the company's headquarters at Chicago. He says there is not much hope of resuming work on the mine this season.

GEORGE CADWALADER, who was the principal lawyer for the farmers in the farmers' debris suits died this week.

Hold on a Bit.

You who are thinking of making a break for the *Cœur d'Alene* country, keep cool, restrain your ardor and listen a moment to a little cautionary advice as we gather it from certain old campaigners, some of whom have participated in all the notable mining stampedes that have occurred in California from the first down to the present day: Went to Gold Bluff in the spring of '51; to Kern River in the summer of '54; to Frazier River in '58; to Washoe in '60; to White Pine in '69 and to Snake River in '71, to say nothing of minor excitements occurring intermediate between these more widespread and sweeping stampedes. Now this is what these old timers tell us—they give it as their opinion that not one man in ten who has joined in these senseless rushes has ever reaped any benefit from them, while thousands of their victims, besides losing their time and money have in other respects been seriously injured, not a few of them wholly ruined thereby. They have been the cause too of much loss of life—more a good deal than most persons suppose. Few know or have ever paused to think how many men have perished in these wild crusades searching after gold in remote localities. Embarking in frail crafts some have suffered shipwreck on their way to or back from Gold Bluff; some overcome with exposure and fatigue laid down and died in the gloomy woods of British Columbia. Some were swept to death over the rapids or engulfed in the treacherous eddies of the Fraser. Of the more adventurous not a few battling with Indians on the distant frontiers, while others vainly struggling sank under their burdens in the snows of the Sierra or perished from thirst far out on the deserts, where their uncollared bones lie bleaching to this day. Such being the results that have so generally attended these mining crazes, it might be well for those who entertain thoughts of immigration to *Cœur d'Alene* to ponder the matter well before concluding to light out for that delectable region. This new sensation may turn out another delusion and a snare. We detect about it the same earmarks that characterized all the earlier movements. It is being engineered in the interests of the same classes, so conspicuous in bringing these old-time frauds into notice. The unthinking masses are being excited by the same means and methods employed for booming Washoe, White Pine and Frazier rivers. And it is curious to note how very similar are the conditions under which this business of awakening public interest and en- thusing the masses is being accomplished. In every instance have these pretended mineral discoveries been made late in the summer or along in the autumn, to be reported just as the winter is coming on. At first, and so long as there was any danger of an immigration being started up prematurely, these reports were of mild and dubious tenor. As the winter has advanced and the snow falling to such depth that no prospecting could be done, the accounts from the diggings have been more encouraging, and, so keeping on, have, by the time spring arrives, swollen into the most Munchausen proportions, creating wide spread excitement and starting a heavy emigration towards the new *El Dorado*.

And this is exactly what has, and is now being, done in the case of the *Cœur d'Alene* mines. Last fall the accounts that reached us from that quarter were not very assuring—a mere after-glow—a faint boreal light, as it were, in the north. Later, this aurora began to flicker and gleam with a more lively flame, and now it shoots aloft a beacon to attract and dazzle with its brightness. How these publicans, traders, locators of mining claims and townsites, habernating up there in this gore of Northern Idaho, came to find out that there was so much gold in these gulches at a time when the ground was frozen deep and covered up under ten feet of snow, is not explained. Probably, however, by the aid of Aladdin's lamp, which reveals treas-

ures hidden away in caves and other obscure places. How it happened that these rich gulches escaped the vigilance of former explorers, the country having been thoroughly prospected years ago, is another mystery. There are, indeed, so many suspicious circumstances connected with this whole business, that we feel warranted in putting the mining public on their guard against it.

Whatever there may be in that country, not much can be lost by waiting a little. If the mines there are as rich and extensive as some represent, there will be room and gold enough for all, even for those who arrive a little late. If the diggings are poor and of limited extent, as others contend, those who have not already

likely to be early and largely tenanted. Many a poor fellow who goes there will probably remain. If he fails to obtain the great object of his pilgrimage to that dismal region, he will receive at least such rites of sepulture as are common in pioneer mining camps—his grave a rude hole in the ground, his shroud a gray blanket.

To all working-men in California our advice is, remain where you are. The haying season is at hand, to be followed by the grain harvest. Of both there will be such crops to be cut and gathered as have never before been grown in the State. The ingathering season will be long, and labor will be in demand at good prices. Parties employed by the farmers in California

sufficient grain to support its population, a considerable quantity is imported from Russia, Hungary and the United States. Quite extensive shipments of fine flours are made to Greece from Austria-Hungary and the United States.

On Rock Drills—No. 2.

(Written for the Press by GEO. J. SPOON, C. E., 415 California St., San Francisco.)

Description of the Brandt Drill.

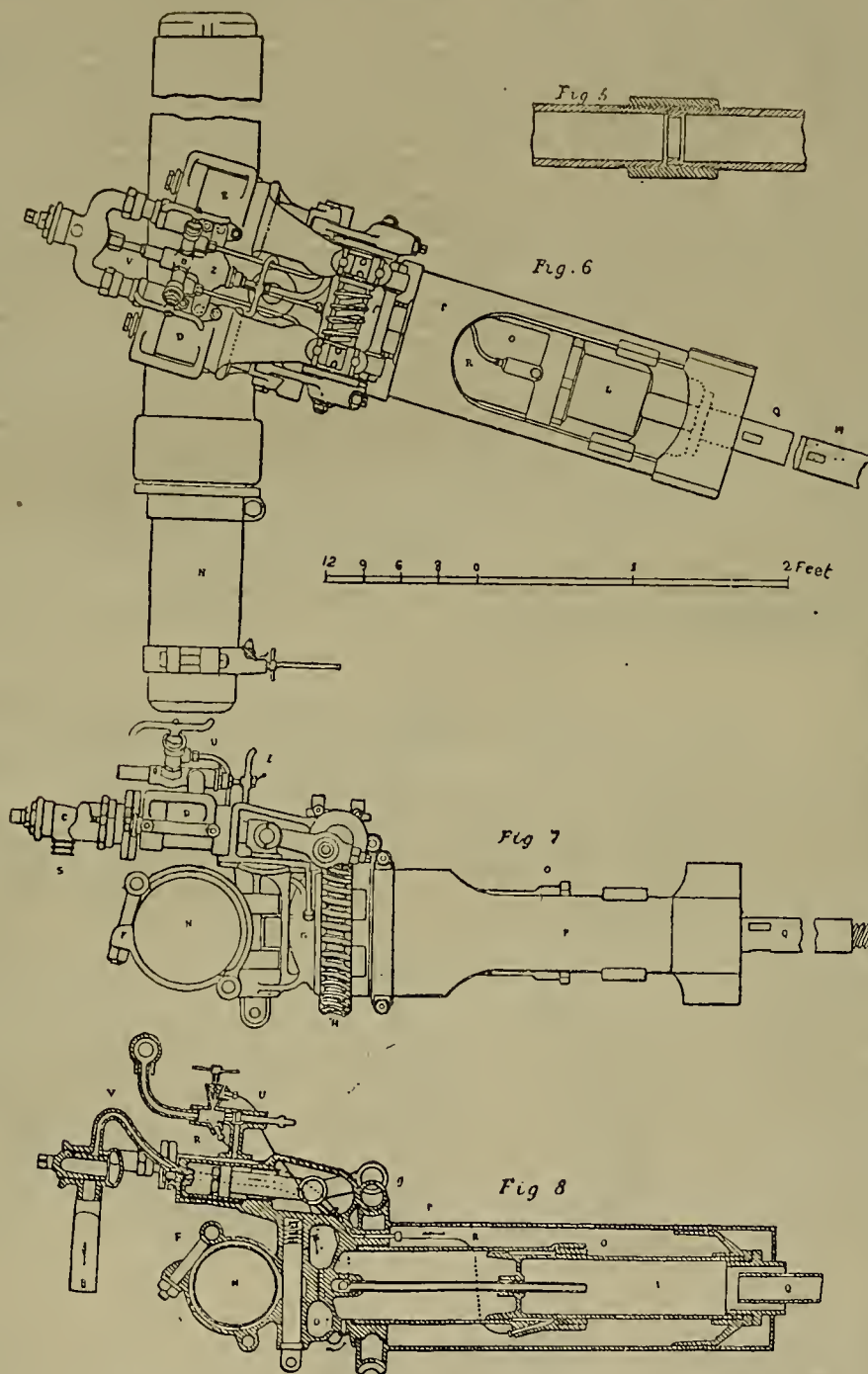
The Brandt drill is shown in the engraving accompanying this article, one view showing it at work and the other showing details. The drilling machine proper consists of the piston *A* and the cylinder *B*, which latter is firmly connected to the socket piece *C*. The head of the piston carries the drill-rod *D*. By introducing water under pressure into the cylinder, the same and with it the drill-bit is pressed against and into the rock. The annular space *E* is constantly filled with water. The rotary motion is imparted by two small hydraulic engines, *D* and *E*, coupled together under 90°, with differential pistons, and attached to socket *C*. Their valve motion is so arranged that the right hand steers the left hand one, and *vice versa*. The engines actuate by cranks a shaft carrying a worm. This worm gears with a worm-wheel, *H*, swinging loose upon the cylinder *R*. The wheel *H* is solid with the outside cylindrical shell *P*, and connected at its other end with the piston *O*, which carries the drill rod. The wheel being turned turns the shell, and thereby the drill. The drill rod consists of a number of longer and shorter tubular sections with flat screws at either end; they are quickly joined and disjoined by a wrench, much quicker than the change of drills in the percussion drills. The drill bit has three, four or five point or teeth, carefully hardened, which protrude a little beyond its edge, making the largest diameter of the bit two and three-fourths inches, while the cylindrical part of the bit is only two and a half inches in diameter. This, however, varies with the different character of the rock. Contrary to the deafening noise of the percussion drills, this drill works perfectly noiseless, only the crushing of the rock under the enormous pressure of the drill being audible.

Drill Column.

The drill is supported by a column *N*. This is constructed after the principle of the hydraulic press, with a differential plunger-piston. By admitting the pressure water into the interior, the plunger-head is forced out against the side of the heading, and the shaft is thus set fast. The plunger can be withdrawn by means of a two-way cock and the pressure upon the annular space between the piston and cylinder-shell. The column and drills are carried on a small-wheeled truck, and are counterbalanced, so as to be in equilibrium when the column is not fixed. The machines can be moved up and down on the columns, and can be swung around the same horizontally. It is kept in position by a clamp. The hind part of the machine,

which remains unmoved and stable during the work, is connected with the clamp by a hinge. By means of a nut the machine can be turned on this hinge, and so assume any desired position. The column can be swung around parallel to the line of the heading, so as to occupy less room, when advancing or retiring. The working of the machine is carried on by means of the valve chest *B*, which contains a single stop cock, *Z*, admitting the pressure water simultaneously into the branch pipe leading to each of the hydraulic engines *D* and *E*, and a two-way cock for producing the forward or backward movement of the drill-plunger.

By opening this cock the pressure water is admitted through the pipe, *U*, to the rear of the plunger, where it acts upon the full area of the plunger, to force the drill-bit into the rock. On closing the cocks the drill is drawn back by the pressure acting constantly upon the small annular space in front of the plunger-piston. By



SECTIONAL VIEW OF THE BRANDT HYDRAULIC ROCK DRILL.

gone had, of course, better stay away from them altogether. It is argued on all hands that not much can be done there before the first or the middle of June, the snow being too deep to admit of work, or even prospecting, being done to advantage for several weeks to come. When the snow begins to melt the streams are swollen into torrents, delaying operations for another two or three weeks along the ravines and gulches where the deposits, if any there be, are mostly located.

Meantime the cost of living in the district will be great, there being also trouble in reaching it, as the streams are high and the mountains blockaded with snow. Owing to uncertainty as to the size of the claims and the practice of locating them over and over, that seems there to prevail, contentions and fights and bloodshed is inevitable. Already shooting on this account has begun, and the traditional graveyard having been started in the camp, is

are apt to receive good treatment, and never fail to get their wages. For all who want work here there will be then abundant opportunities. That the man who embraces these opportunities will fare better and find himself richer at the end of the summer than he who seeks fortune in the *Cœur d'Alene* or any other mines, we verily believe. Of course a certain class of excitable men will go anyhow, but thoughtful consideration will be best for all.

MILLING IN GREECE.—The wandering class of people in Greece and Turkey, as well as many other of the poorer class, still use the ancient hand-mill for crushing the corn, wheat or barley. The coarsed parts are sifted out through a common tin or wire sieve. The flour is simply mixed with water and baked in hot ashes between iron plates. There are now a great number of wind flour mills, a few ship mills and some steam mills. As Greece does not raise

ENGINEERING NOTES.

A Railway Through the Sahara.

In a lecture delivered to the Lower Rhenish Architects' and Engineers' Association, Herr Juttner lately gave some interesting particulars on French railway projects for the northwest of Africa. The Sahara railway is intended to connect Algiers with Timbuctoo; but the obstacles in the way of its successful accomplishment are serious, the construction of the 1,700 miles of railway being impeded by the climate, the scarcity of water, the dangers arising from sandstorms and the hostility of the natives. The temperature of the Sahara is especially trying from the fact that the nights are extremely cold. For the purpose of supplying water an extensive system of water-pipes is spoken of, which would cost about \$8,000 a mile; but it is also remarked that there are in the Sahara underground water courses, which, coming into view at certain spots, form oases. It is therefore argued that artesian borings would probably be successful, so that the pipe communication alluded to could probably be confined to various points.

The only detailed plans in existence regarding the Sahara line are those which affect the portion in Algeria about 250 miles in length. Of the remaining 1,450 miles, about one-half would seem to have been roughly planned on the information of travelers, while the projects for the remainder of the line are of a vague character, being founded on unreliable information. The cost is estimated at \$80,000,000, and the whole scheme is based on the material assistance of the French government in its execution. The calculations of profit are partly founded upon the gain to be derived from the importation of salt into the Soudan, where it is worth from 18 to 26 cents per pound. The company working the line would have a monopoly for the sale of salt, and a revenue of \$2,000,000 is looked for from this source. The import of various necessities and the export of products of the Soudan are relied upon to supplement this return in an important degree, the rates being based on charges of three cents per ton per mile for most classes of goods, and 1½ cents per passenger per mile.

THE GRANDEST STAIRWAY IN THE WORLD.—The Calvario Hill, just west of the city of Caracas, the scene of a battle between the Spaniards and the patriots in June, 1821, has been made into a beautiful park. Going up the mount is what I believe to be the most magnificent stairway in the world. I have never seen anything approaching it in stateliness and beauty in Europe. It is of sandstone, 100 feet wide and 80 feet high. The park cost \$2,000,000. The crest is 600 feet higher than the level of the city, and is surmounted by a statue of the "Great President," Guzman Blanco, the "illustrious American," as he is called, who has done so much to pacify and build up the country. He may have made money during this working, but the people certainly have the improvements. He is worth about \$15,000,000.

HOW LONG WOULD IT TAKE TO FILL THE SAHARA?—In view of the recent project to fill up the Desert of Sahara by connecting it with the Mediterranean sea, a correspondent of the *Scientific American* writes to that journal inclosing a few figures, the results of some calculations. According to the latter it would require 4,000 years for the waters from the Mediterranean to fill the valley of the Jordan, which is 1,000 feet below the former, the water to flow through a passage 100 feet wide by 25 feet deep, with a velocity of 4 miles an hour. With a channel 100 times this capacity it is possible, he says, to limit the period of filling to 40 years. At the same rate it would take 40,000 years to fill up the Caspian sea to the sea level, and thousands of years to fill up the Sahara.

A TWELVE MILLION BRIDGE.—It is reported from Russia that the question is being agitated of connecting Constat and Oranienbaum by a bridge at a cost of \$12,000,000. The structure will be erected under the supervision of engineers appointed by the Russian Government. It will rest upon granite pillars fixed by the caisson method, each of them protected from the action of the waves during the prevalence of southwest winds by an angular wall-like guard of stone. The bridge will be about 5 miles in length, and it is expected to be completed in the year 1889. When finished it will consist of two parts—a railway and a foot-bridge—and will be illuminated by the electric light.

THE MESSINA TUNNEL.—From recent observations it is said that there is great probability that the geological structure of the bottom of the straits of Messina is favorable to the excavation of the proposed tunnel. As yet, however, the data secured are not very elaborate, and of course the conclusions based on them cannot be precise.

A PRIZE FOR ELECTRICIANS.—The Italian government has determined to offer, on the occasion of the opening of the Turin Exhibition, a prize of 10,000 francs for the most practical process for the transmission of electricity.

USEFUL INFORMATION.

To Get Rid of Clinkers.

EDITORS PRESS:—In the last number of your journal it is stated that the only way of getting rid of the troublesome clinker is to knock it off with a hammer. Some years ago I had a large office stove which had become almost filled with clinkers. I made a good fire in it, let the clinkers get thoroughly hot, and then placed on the top of the fire and in contact with the clinker, half a dozen oyster shells. The fire was then allowed to run down, and the clinker was found to be so soft that it could be scraped or cut off with a shovel, just like soft cheese. A few lumps of lime, I presume, would have answered the same purpose, the lime in the oyster shells acting as a flux. C. W., New York, April 16, 1881.

AN ELASTIC LACQUER.—*Van Nostrand's Magazine* says a lacquer of great elasticity, perfectly supple, and not liable to peel off, is made in the following manner: About 120 pounds of oil varnish are heated in one vessel and 33 pounds of quicklime are put into 22 pounds of water in another. As soon as the lime causes an effervescence, 55 pounds of melted India-rubber are added. This mixture is stirred and then poured into the vessel of hot varnish. The whole is instantly stirred so that the ingredients may become thoroughly incorporated. Straining and cooling complete the process. When required for use it is thinned with the necessary quantity of varnish, and applied hot or cold to wood, iron, walls, water-proof cloth, paper, etc.

BURNING WATER GAS.—From abroad comes the news that an American now residing there has succeeded in perfecting a contrivance that is apparently destined to widely extend the sphere of usefulness of water gas. He fits an ordinary fish-tail burner with a refractory attachment, made luminous by the combustion of ordinary non-carburized water gas, and has found, by a series of carefully conducted photometrical observations, that the water gas will give 1.8 times the light of coal gas in the same kind of burner and for the same volume. It is likely, therefore, that in the future water gas will be distributed for fuel and for lighting purposes simultaneously.

WOVEN BELTS.—An advocate of cotton belts says: "Woven belts give and take. This is in the nature of a woven material. When first put on, they require 'taking up' once or twice more than leather. The stretch is approximately six per cent, as against four per cent in leather; but, once well at work, they give less trouble, as there is but one joint to look after. If put on really tight enough, this stretching is minimized to a great extent. Users are afraid to overstrain the belt, but the extraordinary result attained by certain experiments made as to tensile strain, shows the impossibility of breaking a belt under fair conditions."

TO PREVENT SCRATCHING MATCHES ON PAINT. A correspondent in Florida, of *New Remedies*, speaks of the defacement of paint by the inadvertent or headless scratching of matches, says that he has observed that when one mark has been made others follow rapidly. To effectually prevent this, rub the spot with flannel saturated with any liquid vaseline. "After that people may try to strike their matches there as much as they like, they will neither get a light nor injure the paint," and most singular, the petroleum causes the existing mark to soon disappear, at least when it occurs on dark paint.

INDELIBLE STAMPING INK.—E. Johanson, of St. Petersburg, gives the following formula for a convenient ink for marking clothing by means of a stamp: Twenty-two parts of carbonate of soda are dissolved in 85 parts of glycerine, and triturated with 20 parts of gum arabic. In a small flask are dissolved 11 parts nitrate of silver in 20 parts of official water of ammonia. The two solutions are then mixed, and heated to boiling. After the liquid has acquired a dark color, 10 parts of Venetian turpentine are stirred into it. The quantity of glycerine may be varied to suit the size of the letters. After stamping, expose to the sun or apply a hot iron.

A GOLD COLORED SURFACE ON BRASS may be produced with a liquid prepared by boiling together for about 15 minutes: 4 parts of caustic soda, 4 parts of milk sugar, and 100 parts of water, to which 4 parts of a concentrated solution of sulphate of copper should then be added with constant stirring. The mixture is then cooled to 167° Fahr., and the well-cleaned articles are immersed in it for a short time, when the gold color will appear. A longer immersion results in the formation of a bluish-green tint, and a still more prolonged action causes the formation of iridescent colors.

TO GLUE LEATHER TO IRON, paint the iron with some kind of lead color, say white lead and lampblack. When dry cover with a cement made as follows: Take the best glue, soak it in cold water till soft, then dissolve it in vinegar with a moderate heat; then add one-third of its bulk of white pine turpentine, thoroughly mixed, and by means of the vinegar make it of the proper consistency to be spread with a

brush, and apply it while hot; draw the leather on quickly and press it tightly in place. If a pulley, draw the leather around as tightly as possible, lap and clamp.

TO MAKE YELLOW OILED CLOTHING.—For a solution for making the yellow oiled clothing that teamsters wear instead of rubber coats and pants: Dissolve 1 ounce of beeswax in 1 pint of the best boiled linseed oil over a gentle fire, applying when cold with a piece of rag, rubbing it well in, and afterwards hanging up to dry, which will take about four days. The same solution also answers for making aprons that are used in slaughter-houses. They are soft and pliable, black on one side, and show the canvas color on other side, but will not let water soak through.

TO EAT BACON WITHOUT SMOKEING.—Curing bacon by hanging it up, after proper salting, in a tobacco barn, is recommended by a Kentucky correspondent as making a sweet and perfect cure, with no necessity for smoking, and leaving no taste of tobacco in the meat. It is probable that the aroma given off by the tobacco has a mild antiseptic effect, such as that which belongs to creosote, carbolic acid, and other substances which occur in wood smoke.

PAPER SOAP.—The latest novelty in New York city is paper soap, which is mainly for the use of travelers. The sheets of paper, which are put up in the form of a small book of about three inches square, are coated with soap and said to be just as good as the regulation article, in addition to being much handier. There are fifty soap sheets in each book, costing in the aggregate about as much as an ordinary cake of soap.

PROFITABLE INVENTIONS.—The smallest invention sometimes proves the most lucrative. A San Francisco lady, inventor of a baby carriage, received \$14,000 for her patent. The paper pail, the invention of a Chicago lady, yields a large income. The gimlet-pointed screw, the idea of a little girl, has realized millions of dollars to its patentee.

TO WRITEN small articles made of copper and brass, boil them in three-quarters of a pound of cream of tartar, and one pound grain tin or any pure tin finely divided. The tin dissolves in the cream of tartar and is precipitated on the brass or copper.

GOOD HEALTH.

Magnetism as a Healing Agent.

Numerous experiments have been made for the purpose of determining the influence of magnets upon the human body. The first experiments made were conducted in Paris nearly a century ago. A man by the name of Mesmer, professed to have obtained remarkable results from the use of large magnets. The French Academy appointed a committee to investigate the matter, one member of which was the eminent Benjamin Franklin. The committee found that some effects were apparently produced by the magnets; but when the magnets were replaced by blocks of wood resembling them, the effect continued the same as before, leading them to the conclusion that the results apparently obtained from the magnets were really the work of the imagination of the patients. Numerous experiments have since been made in the same line, and some persons have claimed results from the use of magnetism; but it is by no means established that the magnet is of any remedial value whatever. Professor Charcot, of Paris, has been quoted as recommending the use of magnets, and we saw a small magnet in use in his Clinic at the Salt Petriere in Paris; but on making inquiries respecting the matter, we learned that he had no faith whatever in the remedial efficacy of the magnet, except as it influenced the imagination of the patient. He employed it in certain cases of hysteria in which the disease was largely due to a perverted mental state. We consider of no value whatever the various forms of magnetic shields, etc., which are recommended and sold as panaceas for nearly all the diseases to which flesh is heir. If magnetism is of any use whatever as a remedial agent, it must be employed in very large quantities, and by the aid of very powerful magnets. The tiny magnets used in magnetic shields would exert less influence upon the circulation than the ordinary-sized pocket magnet carried in the vest pocket. A magnetic insole will, of course, aid in keeping the feet warm, as will insoles of any other description. —*Herald of Health*.

Pine Extract for Bathing.

It has long been recognized that the atmosphere of pine forests has an invigorating and beneficial effect upon people with weak constitutions and suffering from pulmonary disorders. At some of the watering places of Germany the very simple prescription of the physician is that the patient should spend several hours a day walking or riding through the pine wood. This simple treatment is sometimes supplemented by the taking of pine baths, and in the cases of kidney diseases and for delicate children this is claimed to be highly beneficial. The bath is prepared by simply pouring into the water

about half a tumblerful of an extract made from the fresh needles of the pine. This extract is in color and closely resembles molasses in consistency, and when poured into the bath gives the water a muddy appearance, with a slight foam on the surface. The repugnance one feels to enter into such a muddy-looking fluid is dispelled as soon as the delightful aroma which arises from the bath is inhaled.

Although there may be some doubt whether pine baths act upon the system in any other wise than as a tonic, still, as an adjunct to the daily bath, infusion of the pine extract induces a most agreeable sensation. It gives the skin a deliciously soft and silky feeling, and the effect upon the nerves is quieting. It is a matter of some surprise to us that the business of manufacturing and bottling the extract for private use and public bathing establishments has not been tried in this country, where pine forests abound so extensively. The extract, when properly bottled and securely corked, will not deteriorate for a long time, and the cost for gathering the pine needles and extracting their tarry substance would not be very great, while the demand for it would likely increase to large proportions when the public became accustomed to its use. This extract is used at the baths at Sharon, N. Y., and many other places in the United States.

A New Cure for Cancer.

Information of one more remedy alleged to possess special virtues in curing "cancer" reaches us through a correspondent from Brazil. Dr. Ignacio Alcibiades Velloso, of Recife, Pernambuco, introduced the remedy to notice, and in a communication to the *Journal de Recife* gives his experience of its use.

He states that the plant, which is popularly known by the name of the "alvelos," belongs to the Euphorbiaceae, and is indigenous to Pernambuco. He alleges that a magistrate who was suffering from epithelioma of the face, and who had returned to his estate despairing of relief, was entirely cured of his disease by the topical application of the juice of this plant. Dr. Velloso, learning this, was induced to employ the same remedy on two patients at the Hospital Pedro II—one a case of canceroid of the nose, the other of epithelioma of the lip—with the result that the first patient was "completely cured" in forty days, and the second in less than two months, "much to the surprise of the other professional men of the establishment." Such results, he thinks, justify a trial of the remedy, especially in uterine cancer.

The action of the juice of the plant, as others of the same natural order, is irritating, producing a spreading dermatitis without much pain; and the application of the cut stem or the juice of the fresh plant to the diseased part is said to result in destruction of the morbid tissue, which is replaced by healthy granulations—doing the work, in fact, of the chloride of zinc paste.

Upon this we need only remark that if the remedy really possesses the escharotic action described, there is less reason for doubting its efficacy in such localized morbid formations as those mentioned than there was for questioning the alleged virtues of other remedies, such as "condurango," which flourished for a time, but which were supposed to operate after they had been taken into the stomach. It is clear, however, that the use of the "alvelos" must be limited to the regions in which the plant grows. —*Lancet*.

ARTIFICIAL HUMAN MILK.—There are several factories in England for making artificial human milk, which is extensively used. It is made from pure cow's milk, which is first placed in a hermetically sealed boiler and heated to a temperature of 100° C. to destroy all germs. Then a digestive ferment, called pancreatine, is added, by which artificial digestion is produced. Then dilute acids are used to precipitate the excess of albumen and to bring about the same constitution as human milk. The process is too intricate for ordinary use. The product is said to produce excellent results. Thirty sick children fed on it in a public institution gained in health and weight most rapidly.

RUSH OF BLOOD TO THE HEAD.—A rush of blood to the head or face, causing a hot sensation for a moment, when not occasioned by violent exercise or mental emotions, is due to some disturbance of that portion of the nervous system which regulates the circulation of blood in the small blood vessels. Such disturbances usually accompany conditions of the system in which there has been loss of nerve tone. It is frequently present in nervous dyspepsia, and is one of the indications of the approach of the menopause, or change of life, in women.

CORPORAL PUNISHMENT.—In the opinion of the *Medical Press*, most physicians are very decidedly in favor of the total abolition of corporal punishment in schools. The editor asserts that the London University College school, which is attended by 500 boys, has been carried on from the first without corporal punishment, and is equal to any school in England with respect to discipline.

INNOCULATION FOR RABIES.—M. Pasteur and his collaborators have announced to the French Academy of Sciences the fact that, by inoculation, they can render all dogs absolutely proof against the effect of rabies, in whatever way or quantity the virus may be administered.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

SOUTH SPRING HILL.—Amador Ledger April 28: The third cleanup of this mine was made on Monday of last week, and resulted as satisfactorily as the previous run. The amount realized was \$7,000, exclusive of sulphurets. About 350 tons were passed through the mill, which makes the average yield \$20 per ton. The mill has been idle since, on account of repairing the shaft. Some of the timbers, 15 inches in diameter, were found to be rotten throughout, and the Supt., J. R. Tregloan, determined not to subject his men to the risk of working with the shaft in that condition. The mine is looking as well as ever, but having but one shaft, the mill must remain idle whilst repairing is going on.

MISCELLANEOUS.—A cleanup was made at the Tellurium mill last week, which panned out less than \$150. The battery had been running 12 days, and the expectation was that the ore would yield at least from \$6 to \$7 per ton, and at this rate the total surrender would have been from \$800 to \$1,000. The drop to \$150 put a damper upon the concern, and has led to the suspension of work, with a slim chance of again starting up in the near future. The big tunnel at Middle Bar is now in over 800 ft. A boulder of quartz was struck last week, carrying considerable sulphurets, but believed to be barren of gold.

Calaveras.

GLENCOE.—Cor. Calaveras Chronicle, April 29: W. C. Childs, our efficient mining Supt., went to the city last week where he was called on matters concerning the Con. Val. M. & M. Co. Two of the mines owned by the company are in operation, and it is reported others owned by the same company will soon be put in working order. The mines are owned by an Eastern syndicate reported to be immensely wealthy, hence there is no good reason why Glencoe should not take the lead as a first-class mining camp. Plenty of rock! Plenty of gold! Admitting the ratio to be sometimes two rocks, one gold. A report is current on our streets that D. Fairchild, the famous prospector, has purchased the McNamara ranch, for which it is said he paid \$1,500. Messrs. Menadue & Frittenbach are preparing to erect an aqueduct on their mine. The motive power will be an overshot wheel driven by water from the Mokelumne canal. The owners have several hundred tons of first-class ore on their dumps. The rock is said by old prospectors to be good—\$50 ore on an average.

WEST POINT.—The Scorpion mine is running in full blast. Mrs. B. Lufkin, one of the chief shareholders, is sojourning in town at present, watching operations. The Wide West is running, and from what I can learn they are taking out rich ore. The Henry mine, now owned by Messrs. Jenkins & Rowe, is going to commence operations in a short time. The Mr. Jenkins, who has recently been in England, will return in a few days with an English Company. The Star of the West will start up soon. Mr. Richardson is daily expected. The San Antonio is shut down at present. The citizens of this burg anticipate lively times this summer in a mining point of view.

Inyo.

DARWIN NOTES.—Inyo Independent, April 28: J. B. White informs us that work goes steadily on in the Defiance, Independence, Sterling, Modock, and other mines around Darwin, and the outlook is very promising for good results in that district this summer. Supt. Fitzgerald will start to crush ore from the Modock about the 10th of next month, and has enough on hand to keep the mill running about thirty days. The Reilly Co. have a force of men in their mines, and the mill is kept running steadily. The company will commence to ship bullion in a short time.

RICH ORE.—M. C. Lasky and John Anton came in from Chrysopolis last Sunday, bringing with them some rich ore specimens from the Carson mine. They report the vein widening as they go down, and the quality of the ore grows better as depth is attained. The ledge is now at the least calculation 24 inches in width, and assays way up in the hundreds of dollars per ton. There is every reason to believe that the Carson will turn out to be a bonanza of no small proportions.

THE NEW FURNACE.—J. W. McMurry, of Big Pine, was in Deep Spring valley during last week, perfecting arrangements to move the Montezuma furnace to its new site at Antelope springs. These springs are the first water reached after crossing the Inyos on the road to the valley. The entire furnace will be on the ground within the next ten days.

DREPP SPRING MINES.—Berry, Broder & Co., are now taking out some remarkably rich gold rock from their mine, the "Gold Coin," in Deep Spring valley. Greenly & Co. are at work upon the wagon road to the "78" mine, preparatory to hauling the ore from that and adjacent mines to the mill, now soon to be in readiness for business. The Sam Piper mine, in the same locality, continues to "horn out" surprisingly rich, in free gold.

CAPITALISTS.—A party of Eastern capitalists, we are informed, passed down the railroad this week on a tour of inspection to the mines of Darwin, Cerro Gordo, Lookout and other mining camps. They were accompanied by H. M. Yerington. This shows that our county is attracting attention from the outside world. And we predict that before the summer is over there will be prosperous times in Inyo.

GOLDEN WEDGE.—Work has been commenced in earnest on this mine—recently purchased by M. L. Cook. The Golden Wedge is situated near Bishop creek, and report says promises to become a good property. We have been promised a full description of this mine and its workings at an early day.

Nevada.

SPENCEVILLE COPPER MINE.—Nevada Transcript, April 25: County Surveyor Hartwell, who has returned from a business trip to the lower part

of the county, says work at the Spenceville mine is progressing with good results. Excellent ore is being extracted in liberal quantities. The regular force of men, including quite a number of Chinese as roasters, are kept at work. This week the Ruby Gold Mining Co. paid H. H. Kennedy, of Good-year's Bar, \$680 for the privilege of tailing into Rock creek for one year. This is the first installment paid by the Ruby Co. under the compromise entered into with Mr. Kennedy last fall.

NOTHING LIKE A MINER'S FAITH.—H. H. Hartley has been granted patents for two quartz mines in Meadow Lake district. Mr. Hartley is the man who first concluded that Meadow Lake had a great future as a mining district, and he is the only one who has stood by it through thick and thin. He says the rock contains enough gold, and that all that is needed is a process that will reduce the rebellious ore. Some men differ with him as to the ore containing gold in paying quantities. The latter say it is easily enough reduced, but that what Hartley wants is a process which will do as strange a thing as to make a turnip shed blood.

QUARTZ MINING ON THE RIDGE.—James L. Morgan, of Cherokee, was in town yesterday, and paid the Transcript office a pleasant visit. Mr. Morgan says that it will soon be determined whether the numerous quartz developments recently made in the neighborhood of his town are of material value. So far the prospects are very flattering, but not enough work has been done to show whether the deposits are very extensive. He promises to keep us posted as to future operations. The Cannonball mill just erected on Thurston Brothers' claim was started Wednesday, and ore is now being crushed.

Plumas.

MINING DISCOVERY.—Greenville Bulletin, April 23: For some days past it was known that a mining discovery of importance had been made near town, but the owner requested that nothing be said about it till further development should be made. Since the early mining days of this district it was supposed by all the old miners that a rich ledge crossed near the head of Taft ravine. This ravine comes down just east of the burying ground, and many years ago a great deal of money was taken out there by ground sluicing. Many pieces of quartz were found containing from \$60 to \$80. A great deal of float rock was picked up and good wages made pounding it out with a hand mortar. More of it was hauled away and milled. All this time search was made for the ledge from which the float was supposed to come, and in this search thousands of dollars were expended. Mr. John McIntyre says he spent over \$2000 in the search. How much John Blood spent is not known, but he had men employed for a long time and did a great deal of work. It is said by several men that Mr. Blood was so eager to find the ledge that he actually made a standing offer of \$10,000 to any persons who should find it. Not only miners, but the business men of the town became interested in the search. Many tunnels were run, bores and shafts were sunk, but the ledge was not found, and the search was given up years ago. Since the death of Mr. Blood nothing was done on the ground till lately. Mr. J. P. Hall, who did not come here till after Mr. Blood had passed away, had often heard the old miners speak of the rich rock found in the ravine, and when coming down the mountain last fall from the Ophir mine owned by him, looked over the ground where all this prospecting had been done. The location of the old tunnels could be ascertained only by the mounds of dirt, as they had all caved in but one, and this one was evidently in bedrock. Some distance down the mountain he noticed several shallow holes from which quartz had been thrown out. This led him to think that if the tunnel was in bedrock, the ledge must be between these holes and it. He examined the ground carefully, and became convinced that if a ledge was there at all it must be within 30 ft of these holes, as there were indications of bedrock at that distance. The winter storms set in soon after, and prevented prospecting till within a few days. In the meantime Mr. Hall had been quietly getting all the information he could from men who had worked on the ground, and with this his own observation had made him very familiar with its features. Last week he went to work in one of the holes mentioned, and after getting the snow shoveled out started to run a cut up the hill. Near the surface rich float-rock was found, and in a few hours he struck what he firmly believes is the long sought ledge. At the point of discovery it is seven ft wide. Surveyor Higbie has no doubt that it is a permanent ledge, and the one so much prospecting was done to find. Several of the old miners have examined the ledge, and all are firm in the same belief, several have also made proposals to buy interests in the claim, but Mr. Hall has refused to sell till he shall do more development. Mr. Hall was at one time manager of the Good Hope mine near Downville; he also owned stock in the well known Pittsburg mine, that for ten years paid dividends, sometimes as high as \$1,800 per share per month. He has means to prospect the claim thoroughly. The ground of this find adjoins the Crown Point on the west, also owned by Mr. Hall, as does also the Ophir Consolidated, into which both would run, direction and extent being maintained. The Ophir has lately been examined by several of the old miners, and is said to be looking remarkably good. This last discovery by Mr. Hall is making some excitement among mining men, and all hands join in wishing him success beyond his hopes.

ANOTHER CHISPA.—Plumas National, April 26: From Yank Hammond, who came down from Johnsonville on Thursday, we learn that Mr. L. Lannes, while at work in his claim on Jamison creek, and almost directly under the site of the old town of that name, picked up a slug of gold weighing \$123. Jamison creek has long been noted for coarse gold and some splendid specimens have been obtained there.

Sierra.

CLEANUP.—Mountain Messenger, April 26: The Bald Mt. Extension Co. cleaned up Sunday 217 ounces, result of the past week's run. Cap. Wilbourn and H. Mason were down from Red Oak, this week and report their tunnel in about 250 ft. The rock is very hard. More rich ore has been found at the Colombo, Sierra City.

Tuolumne.

SOULSBYVILLE.—Tuolumne Independent, April 28: We learn that Mr. Johns, the special agent of the company owning the Soulsbyville mine, and who made a special visit to the mine last week and thoroughly examined everything, was well pleased and

recommended active work with a full force. Since the rebuilding of the hoisting works, which unfortunately were accidentally burned down last fall, only a small force has been employed until the company's special agent could examine and report. And now, as the report is favorable, the largest force that can be profitably employed will, in a short time, be engaged in getting out the fine ore and turning it into fine gold. This will not only be profitable to owners and employees but to the entire country.

The Divoll Bonanza is booming and a large force of men is being put to work to develop the mine the same as any other first class property should be. Mr. Divoll has returned to Sonora for the purpose of Superintending in person, being an old professional and lucky pocket miner. Outside of the mammoth gold bunches the vein contains large paying quantities of milling ore. When this mine is opened as it will be under the guidance of Mr. Divoll's superior judgment, it will, in the judgment of practical miners hereabout, eclipse the celebrated Bodie Standard. Johnnie Pedro found a piece of gold weighing \$310, in new ground, on the ledge, at Brown's Flat, on Monday. The gold was almost round, and had a small piece of quartz attached.

Trinity.

RESUMED WORK.—Journal, April 8: Work has been resumed on the Brunswick mine in French gulch district, most of the stock in which is held here. Rich developments are looked for.

NEVADA.

Washoe District.

GOULD AND CURRY.—Enterprise, 26: On the 2700 level the usual progress is making in the joint Best and Belcher east drift. The drift is in fair working ground, but is very hot. The north drift from the Bonner shaft on the 1200 level has reached the south line of the Con. Virginia. At this point it will be taken by J. P. Jones and others, who will proceed to mine the California and Con. Virginia upper levels for low grade ore. From this drift the best and Belcher folks are now running a crosscut west to explore the ground on the 1200 level in that direction. There is in this part of the mine a considerable amount of ground that has never been explored, and the chances are good for finding ore in it, as the indications are very favorable.

SIERRA NEVADA.—Crosscut No. 1 west, on the 3100 level, 80 ft north of the joint Union Con. winze, is out 16 ft. At this point there were signs of water and the diamond drill was put in. The drilling from the crosscut has been considerably delayed. Some of the diamonds were lost out of the drill and they were obliged to wait until new ones could be sent for and received. West crosscut No. 2, 123 ft north of No. 1, crossed the streak of low grade ore found in the latter, and west crosscut No. 3, about 100 ft north of No. 2, has been started. It is not yet out far enough to cut the ore streak. The work of repairing and retimbering the winze between the 2300 and 2400 levels is about completed.

OPHIR.—Work is progressing on the 150, 230 and 250 levels. Ore is being extracted from the latter level, and on the others several exploring drifts have been run and some old drifts and other openings are being cleaned out. The ore is being worked at the Morgan mill, on the Carson river.

YELLOW JACKET.—Sufficient ore is being regularly extracted from the old upper levels to keep the mills on the Carson river running to their full capacity. The quality of the ore remains about the same. A considerable amount of prospecting is being done at several points in the mine.

ALTA.—The only work doing in the mine at present is that of drilling west on the 2150 level. Work has been discontinued on the east drift on this level on account of the signs of water that were encountered. As soon as they have done drilling west, the drill will be put into the east drift.

CALIFORNIA.—The east drift on the 2900 level, joint with Con. Virginia, is being pushed as rapidly as possible in ground that works very well. It is now out 100 ft, about half the distance it has to go to connect with the main north and south drift.

CHOLLAR.—The main west drift from the Combination shaft is being extended through the Chollar ground for prospecting purposes. As it is advanced it will be gradually turned to the southward. The material encountered is principally vein porphyry.

UNION CON.—West crosscut No. 1, on the 3100, is out about 23 ft. It is still in vein porphyry of about the same appearance as that in the main north and south drift. This is the only point in the mine at which work is now being done.

CON. VIRGINIA.—The joint California east drift, on the 2900 level, is being advanced at the rate of nearly 30 ft per week. It is now out 100 ft, which is about half the distance it had to go to connect with the main lateral drift.

MEXICAN.—The winze that is being sunk below the 3100 level is down 30 ft. It still continues in vein material of about the same character as that in which it was started. Work is being done at no other place in the mine.

HALE AND NORCROSS.—A west crosscut has been started at the foot of the incline on the 2800 level. It is out about 30 ft. The ground is dry, and is a mixture of quartz and porphyry. The drift will gradually be turned north.

BELCHER.—The several drifts in the old upper levels continue to yield well, and the mills are kept going. A considerable amount of prospecting is being done in different parts of the mine.

BEST AND BELCHER.—Good progress is being made in the joint Gould and Curry east drift on the 2700 level. The ground works very well, but the drift is very hot.

ANDES.—Some paying ore continues to be extracted and the prospecting drifts encounter a good deal of quartz of a promising character.

COMBINATION SHAFT.—Are now sinking below the 2800 level. At a proper depth the Cornish pump will be moved down the distance of another lift.

SAVAGE.—Work has not yet been resumed in this mine. The water tapped by the north drift on the 2600 level is slowly decreasing.

CROWN POINT.—The usual amount of ore is being extracted, and the mills on the Carson river are kept running to their full capacity.

Belmont District.

WORK PUSHED.—Belmont Courier, April 26:

Work is pushed vigorously in the Belmont mine, and the face of the drift on the 200 ft south level is in good ore. Very fine ore is now being hoisted to the surface. Messrs. Lamb and Griffin are busy prospecting in the Monitor-Belmont mine.

Columbus District.

MOUNT DIABLO.—True Fissure, April 26: But few changes of note have been developed in this mine since the date of the last report. This north crosscut from winze No. 5 has been driven 14 ft, and in the west intermediate, between the second and third levels, a south crosscut has reached a distance of 11 ft in length. An east drift is being in the intermediate, between the second and third levels, near winze No. 5. A west drift is also being driven near the same point, and is showing some good ore in the bottom of the drift. The south crosscut, from the east drift on the second level, is in 156 ft. It shows a small spot of \$60 ore. The west drift on the second level, from the crosscut near the Callison winze, has been stopped and a drift has been started west on a small streak of \$70 ore. The incline has been sunk 14 ft during the week. It is now down 87 ft below the third level.

COLUMBUS CON.—The work on the different levels is progressing with very satisfactory results. The crosscut from the fourth level has been extended a short distance in ground that is favorable for a development of ore, having a considerable quantity of vein matter in the face. Encouraging prospects continue to be found in the drift to the west from the main drift on the same level. The work in the drift to the east from the same point has been resumed and some ore of good grade is being obtained from this part of the mine. The west drift from the south crosscut on the 150 level remains inactive, as also does all operations on the first level.

Cerro Gordo District.

REPORTED STRIKE.—Walker Lake Bulletin, April 21: Another rich strike is reported on Buena Vista Mountain, in Cerro Gordo district. The ledge is said to be four ft wide and assays over 500.

Grantsville District.

PARYVENU.—Bonanza, April 26: S. G. Post has cut into a vein of ore in the Paryvenu mine that shows free gold. How extensive it will prove can only be determined by going down on it. In any camp on the coast where mining operations are being pushed vigorously and mines worked for what they contain a prospect that would make as good a showing of free gold could be sold for several thousand dollars; but, unfortunately, in Grantsville if a man had a mine from which ore could be profitably extracted in sufficient quantities to run a 100-stamp mill 50 years the ore would have to be allowed to remain in the mountain for lack of capital to properly work the mine. Reduction works cost too much money for this poor chondrier to ever dream of turning his ore into bullion at his own mill, and if he ships it to a distance it has to work over \$200 a ton before he is decently paid for his labor. About the only thing that will put life into things in this section will be the resumption of work in the Fer'd S. Van Zandt serious of mines.

Garfield District.

A MILL.—Walker Lake Bulletin, April 28: Hon. George Ernst, of Nye county, is in Garfield district laying out a site for a mill. Garfield will soon be one of the busiest districts in the State. When they get a mill in there close to the rich ore, the small st veins will be worked. Some of these veins carry an enormous proportion of silver, and wonderful returns will be received from there.

Eureka District.

ANOTHER FURNACE.—Sentinel, April 21: Steps are being taken by substantial and responsible gentlemen of Eureka to lease the old Matamoras furnace (capacity 40 tons) and run it in the reduction of custom ores. They are negotiating with a number of mine owners and superintendents with the view to have them guarantee them the ore from their mines for a reduction for a given period, six months, we believe. The Matamoras is a comparatively new furnace, belonging to Chicago parties, to whom application has been made for lease. There is good prospect of the consummation of the scheme, and it is certainly to be hoped that it will be successful. The new company proposes to reduce ore for \$10 per ton—\$2 less than anybody else will reduce it here for now. This difference in favor of the miner is practically immense. Four bits difference per day to a man who earns his living by taxing his muscles and the drip of sweat is vast, and \$2 is four times four bits. And then what a quantity of ore there is that will pay with \$2 added to its value. A careful mining Supt., who guarantees all the ore from his mines to the new smelting company, says the proposed reduction will add 300 miners to the camp. It is a big thing for the town, and a living margin for the honest miner.

Ellsworth District.

NO WORK.—Grantville Bonanza, April 26: We do not think that work will be resumed in the Mount Vernon mine, Ellsworth, in the very near future.

Mount Cory District.

THE MOUNT CORY.—Walker Lake Bulletin, April 21: The mill is now working about 50 tons of ore per day and regular weekly shipments of bullion are being made. It is reported that another rich strike has been made in the lower levels of the mine. Earl & Co's teams are now hauling about 45 tons of ore per day to the mill. There is a surplus of 500 tons in the ore-house.

Pittsburg District.

NEW CLAIM.—Battle Mountain Messenger: Thomas Cummings, an old Base Range miner, has discovered and located a mining claim near Pittsburg district, which promises to be a big find. The ledge is a large one, being 20 ft in width so far as prospected, and assays from \$75 to \$300 per ton in gold. The mine lies on the north side of Crum's canyon, and is about three miles from the Morning Star and Pittsburg Consolidated mines in Pittsburg district, and is in the same mineral belt. Mr. Cummings has succeeded in getting W. O. Mills, Jr., interested in the property, and they have made preparations to sink a shaft to the depth of 100 ft to test the ledge, and if satisfactory at that depth they will begin working the ore, of which there is an abundance on the surface. Mr. Cummings thinks they have got a bonanza, and from what others say they have certainly got a good prospect for one.

Sherman District.

MOVING QUIETLY.—Reno Gazette, April 26:

L. J. Flint, P. Bates, W. N. Coughlin and John Fitzgerald visited the mines in Sherman district yesterday, and report things to be moving along quietly but surely. At the Burke mine the ledge has been opened on the surface in several places, and shows considerable rich ore in spots. The shaft of the Stephen A. Douglass is now down 87 ft. When a depth of 100 ft is attained, a crosscut will be run from the bottom of the shaft to cut the vein. The formation through which the shaft is now passing is mineralized to some extent, indicating a near approach to the ledge. No other mines are being worked at present.

Tybo District.

ORE.—Belmont *Courier*, April 26: There is considerable ore exposed in the 2-G mine at Tybo, and it is expected that the next run will be a good and profitable one.

ARIZONA.

HUMBURG DISTRICT.—Cor. Prescott *Courier*, April 26: Old Humburg camp is to have a boom at last, which consists of a ten-stamp mill, complete. The machinery was unloaded at Maricopa a few days ago. The stamps weigh 1,000 pounds each. The engine is 40 horse-power; boiler, 100 horse-power. There is also one large Blake rock crusher. Total weight of machinery, 80,000 pounds. The name of the company operating here is the St. Louis-Avapai M. and M. Co. There are now 25 men employed in making a road from Frog-tanks to Humburg, which will be completed in about two weeks. The machinery will then be hauled to the mill site and put in place just as quick as money and mechanics can do it. The mines belonging to this company have been well prospected. There are hundreds of tons of ore on the different dumps, and particles of gold can be seen in a great many pieces of the ore. Where gold is not visible the ore prospects well. There are 17 claims, and it will take a long time to mill the ore that is in sight. There will be about 50 men employed just as soon as the mill is completed. There will also be a five-stamp mill and concentrators put up during the coming summer, about two miles above here at Farley's camp. The concentrators will be shipped to Benson for reduction. Mr. Montgomery is running his astrara on ore that pays \$50 per ton. Jones & Thompson are running their astrara on rich ore. Pete Donnelly has out several tons of choice ore that he will work soon. Farley & Co. have been running their astrara some time on ore that pays well. They will make a cleanup in about a week. West of Humburg about two miles, on Cow creek and its tributaries, ten men are placer mining and making good wages. Just over the ridge and north of Tip Top, the silver miners are happy because they are taking out lots of shipping ore that yields 300 ounces of silver per ton.

THE STARKE AND EWING MINE.—Mohave County *Miner*, April 26: This valuable claim, which was located as long ago as 1871, is the first south extension of the Fairfield mine, and lies between the Fairfield and Keystone mines, the two latter being two of the best known mines in Mohave county. The "Starke and Ewing" takes in all the ground between the two above mentioned mines, some 400 ft in length along the ledge. Although it is little more than a quarter the usual length of mining claims, it more than makes up for it in the width and extent of the ore body. Situated as it is on the hillside just north of town, the immense croppings of the vein are plainly visible from town. This property has just been purchased of John Hughes by B. Moses, for Messrs. Glyn & Co., of New York. The ore body has not yet been crosscut anywhere on the claim, but the surface indications would lead one to estimate a width of at least 10 to 20 ft. What this immense body of ore will average of course cannot be determined at present, but assays taken from the shaft range from \$43 to \$75 per ton in silver. The ore is a blue sulphuret, and from appearances could be readily milled. There is a pile of ore on the dump containing about five tons, which has been picked over two or three times by former owners and which sampled 43½ ounces to the ton at the Kingman sampling works. If the present width of ore continues for 200 or 300 ft down, and there is every indication that it will, there will be enough ore to keep a 20-stamp mill going for years. The whole ledge will pay to run through the mill just as it comes down. This is not a mine for a poor man, but it is just such a mine as a good company, prepared to properly open up and develop it, wants. With careful sorting, much of this ore would pay to ship, but we do not expect to see a pound of ore shipped. We expect that when the owners realize the vast amount of ore this little claim can produce they will at once make arrangements to have the ore milled at the mine.

IDAHO.

ANOTHER STRONG CO.—Cor. Wood River *Times*, April 25: Dr. Hayford and Dr. Yingling, both of whom are well known in your section, have just sold the Silver Vale and Golden Gate claims to the Oriental G. and S. M. Co., of Boulder, Col., whose home office is in Philadelphia, Pa. This Co. owns three good mines near Boulder, Col., but wanted something better; hence the sale. It is composed of live, substantial business men of Philadelphia, and it will no doubt begin work soon, and make things lively in and about the camp. The Vale and Gate are about two miles northwesterly of Bellevue, and about three miles southwesterly of Hailey, on the same belt as the Minnie Moore, Bullion, Mayflower, etc. Harry G. Wright, Colonel Canavan, and other Bellevueites are interested, and will look after the Co.'s interest on Wood River. The Forest creek Co. propose renewing work on their mines as soon as spring opens and one of the company can visit Wood River. This company will yet make Narrow Gauge-gulch busy as a beehive. The Wood River country is decidedly beginning to look up in the East. The late sales of the Minnie Moore and other first-class mines in Alturas county have done much toward bringing the Wood River country into notice.

PLACER MINES.—Idaho *World*, April 22: Placer miners around Centerville are at work—some running off gravel and others preparing to work their ground. Nick Hoover and Jake Kellar have been panning about two weeks in their claim below Centerville. Steve Dempsey has the water through his upper ditch, and the hydraulic is whizzing water against the bank in his claim between Henry creek and Cen-

terville. A. A. Spain has leased his ditch to a Chinese company working the Johnson claim below Henry creek. A Chinese company has been at work in Henry creek two or three weeks. Bob Williams and Jas. Smith have been running a cut the past three weeks near the quartz mill. They will work the ground by ground sluicing. Are now trying to find an old channel, and when they get into it expect to find the "yellow stuff" quite abundant. They have already struck gravel that prospects very well, and also boulders of quartz—float—that is gold-specked and will mill high. This float is all saved and will be crushed. John Lamberton, and Harry Chichesster, old Mexican war veteran, and whose arrival in California ante-dates the gold fever of '49, are making the gravel fly this side of Henry creek. When Harry's "hydraulic ram" is brought to bear, gravel will fly more furiously. McCurdy & Co. will also soon go at their diggings, near Henry creek, with a "ram."

COEUR D'ALENE NEWS.—Coeur d'Alene *Pioneer*, April 24: The opening of the present season is heralded from all quarters by the jingle of the precious metal. The high water in the main creek has restricted operations to the side gulches, but so far as heard from, pay is reported in every instance. In the 22 gulches between the mouth and head of Pritchard creek are over 2,000 men, who are sluicing and actually taking out gold by the pound. You gaze at the bottom of these boxes and the glare of gold meets the eye. With these facts the future of Eagle is indeed golden. What are the probabilities of the future? That the main creek will pay its entire length is an undisputed fact. As soon as the high water subsides, operations will be resumed, and as it is reasonably certain that the bed-rock has pay, we can confidently look forward to a boom that has heretofore been unapproached in magnitude. The thousands who are laying back awaiting developments will soon have the coveted profit thrust under their very eyes, for the dust now coming from the side gulches speak in no uncertain tone of the wealth of these hills. The recent clean-ups in Dream gulch will startle no one who has any confidence in the country.

THE STAMPEDE.—It is safe to say that the Pacific Coast or the world never saw such a stampede as has already started in for the Coeur d'Alene mines. There are now about 3,000 people scattered about in the timber on Pritchard and Eagle creeks, while at various towns, which have been selected as points of observation and approach, it is estimated not less than 15,000 people are stationed, awaiting developments and for a favorable opportunity to reach the mines, with their goods, chattels and building materials. Within two months we may expect to see our gulches teeming with the activity of 50,000 men building stores and dwellings and preparing for the tremendous boom which will follow during the summer when the great crowd comes from more distant points.

HYDRAULIC.—The old river drift which can be plainly seen on the north hillsides along Pritchard creek for a distance of six miles, will eventually be the scene of the greatest activity in placer operations. This drift is an old river deposit—apparently of the tertiary period—and prospects everywhere from a half to five cents to the pan. In California this would be considered a veritable bonanza, but here it awaits the touch of capital. The gold differs from that in the creek by being somewhat smooth and water-worn, showing a more ancient deposit. Deep gravel deposits exist in this range, and the inexhaustible amount of ground open to the hydraulic opens up a new industry the importance of which can hardly be estimated at the present time.

DREAM GULCH.—Dream gulch is only two and a half miles east of Eagle, and was struck and located in October of last year by F. M. Davis, who claims to have been guided to the spot by a vision of nuggets which settled upon his brain for three consecutive nights. It is two miles long and is located its entire length. The gulch is less than a claim wide in most parts and sufficient water is available for most of the season's run. Last week 63 ounces were cleaned up after a three day's run on the Webfoot claim, and a second run of two days resulted in the recovery of 60 ounces of coarse dust. The total value of the gold was \$2,000, which represented five days' work for 20 men—or one day's work for five men—an average of \$500 per day to the man. Last Thursday 94 ounces were obtained from a run of 36 hours. An area of bedrock 25x100 ft was cleaned in obtaining the result stated above. Bedrock averages 15 ft in depth and is a shaly slate. The surface dirt is a gravel held in a matrix of dull red clay. The Webfoot company comprises Messrs. Laird, Davis, Roy and Ebbert, who own two claims in the gulch. Considerable development work has been done on the Webfoot—a reservoir having been constructed and preparations being made to put in a hydraulic which can be done at very little expense. With a large reservoir work can be carried on the entire season. Frank Reed and Alonzo Lowe own No. 1, adjoining the Webfoot. They have a force of men at work opening up the claim and there is every reason to believe that it is just as good as the Webfoot. A drain ditch is being run to bedrock and sluices are already in position. Several small side gulches are tributary to Dream, and in all of these dirt—from grass-roots to bedrock—prospects well on the crude shovel. The colors are, as a rule, very coarse and of a dull rusty cast. The formation is shaly slate and porphyry and the bedrock is from 15 to 50 ft deep. A quartz lode has recently been discovered near the head of the creek which is said to be a marvel in richness. The discoveries have kept the matter very quiet but enough has leaked out for us to say that the camp will have a quartz revelation from Dream gulch which will astonish the pioneers.

In McCormick gulch active work in the sluices was begun last Friday. Claims are changing hands at a lively rate. Sales are being recorded daily. Dream gulch is determined to eclipse her former record. Sunday's run at the Webfoot netted 70 ozs. It is reported that the Reeder claim, just above the "Widow," was jumped last week and re-located. The gold from Beaver is of a finer quality than any yet found in the creek. Its value is \$19. In Missoula gulch extensive preparations are under way for a summer's run. The gulch is already netted by the sluice box and tail race. Raven is excited over a mammoth ledge recently uncovered in its vicinity. The find is of the same character as the New Comstock on Eagle river. On the Eureka claim, in Butte gulch, 12 ozs. were cleaned up in a day's run.

Missoula gulch sent in to-day 7 ozs. from the French boys' claim. Preparations are in progress for sluicing the bar diggings just above Eagle. A reservoir is being constructed so that work can be carried on during the entire season. Messrs. Henderson & Porter have a lease on the Gelatt claim, at the mouth of Dream gulch. They have put six men to work, and yesterday got their boxes in place preparatory to sluicing. On the tops of the highest hills between Eagle and Murrayville huge wash boulders are found, which clearly indicate the extent of the wash which covers the entire country on the north side of Pritchard creek. The snow on the south hillsides is nearly gone, and prospectors are roaming in their glory in search of the precious leads. Look out for something big and rich too. It is sure to be found, and at no distant day either. In nearly every side gulch great preparations are being made to take advantage of the high water. Much of the saw-mill product is being used for sluice boxes, and all are jubilant over the prospects. The channel has nowhere been found on Pritchard creek. It is the experience of old placer miners, however, that where the rimrock pays largely, a corresponding increase can be looked for in the channel. The led-rock has been found to pay on both sides, and that the channel will be far richer than either side, is a reasonable conclusion.

MONTANA.

MINES NEAR HELENA.—Independent, April 26: One of the famous clusters of bonanzas that are achieving such celebrity in the vicinity of Helena, is the A. M. Holter lead in Jefferson county. The Elkhorn Co. are now vigorously developing this lead as well as milling the product extracted. About a year ago the Elkhorn Company was organized and put up a ten stamp chloridizing mill upon the lead. The former wet crushing mill which had been erected had not been able to save over fifty per cent of the silver, and hence had not been a success. A marked improvement at once resulted, the main shaft is now down upon the lead over 300 ft. and near the bottom of it, an east and west level has been pushed along the lead to a distance of sixty ft. each way. The vein is about six ft. in width in these levels, and the ore body averages about 80 ounces in silver to the ton and a small percentage in gold. The shaft has been run down to water level and the owners are now putting in a large Knowles pump and will be sinking again in a few days. At water level the ore increased in value about twenty ounces to the ton, and the vein at the bottom of the shaft shows an increased width as well as richness, being seven feet wide at that point. The mill is now crushing regularly twelve tons of ore per day, and it is expected to increase the amount to fifteen tons as soon as it gets into good running shape. The gross product saved is about \$80 in silver to the ton, and the expense of mining and milling the ore about \$20, leaving a handsome profit of some \$60 per ton or \$720 per day, as the present net yield. It is expected that the large pump now being placed in the mine will drain it to a depth of 1,000 ft. and if the shaft and levels continue to develop a vein as wide and as rich as now exists, the ten stamp mill will give place to one of 20 or perhaps 30 stamps, and the present yield per day will be doubled or trebled. The company are working day and night shifts in running the levels and sinking the main shaft, and their large force of men in the mill and mine are all under the supervision of their efficient Supt., J. O. Kilburn. It is the purpose of the company to thoroughly develop the mine, and they have enough ore already in sight to run their present mill for two years. The fortunate owners evidently have one of the finest mining properties in the territory. The success of the Elkhorn Co. is but another illustration of the immense mining boom now existing in this portion of Montana. Mr. Holter justly regards quartz mining as in its infancy here. All around us developments are going on, particularly in Ten Mile district. It is a fact that five leads within less than 20 miles of Helena are now yielding between twelve and fifteen thousand dollars per day in bullion. The following estimates are based upon information derived from the highest sources as far as obtainable and are substantially correct: Yield per day. Helena Mining & Reduction Co., (at Wickes,) \$6,000; Gloster, \$2,000; Gregory, \$2,000; Drum Lumber, (estimated,) \$3,000; A. M. Holter, on Elkhorn mine, \$500. Total \$13,900. If we add to this the yield from a number of less noted mines in close proximity to the city, and include the placer yields, the revenues from cattle and sheep, saying nothing of agriculture, it is safe to say that not less than 20,000 dollars per day is regularly added to our money circulation in this city, the greater portion of which remains with us. Taking into consideration the immense developments in quartz mining going on around us, and the fact that almost all of our large mines like the Drum Lumber are increasing their mill capacity, it is probable that before twelve months this yield will be increased to \$50,000 per day or \$1,500,000 per month! Our readers can well understand from these figures the secret of the Helena boom—and why those who have the best means of knowing sanguinely expect that our city will have a population of 20,000 before two years.

NEW MEXICO.

NOTES.—Silver City *Enterprise*, April 18: The coal strike at Fleming is attracting some attention. Much activity is exhibited at Pinos Altos; an era of prosperity is in store for the camp. Work is progressing on many of the claims in Steele Rock district. Ore shipments to the Benson smelter will shortly commence. Many men are gulch mining on Gold gulch, southwest of the city. For the first time in a number of years a sufficient quantity of water for sluicing purposes is in the gulch. Rich quartz ledges have also been discovered in the vicinity of the placer claims. The Jerry Boyle and Bonnie Jean claims are the only two upon which work is being done in the Shakespeare district. The five-stamp pony mill of Peter Wagner started on the 13th inst., and has been kept in motion since that date. Mr. Wagner has put in a Rapid ore concentrator which is also running to perfection. Pinos Altos is fast coming out and will in all probability be one of the liveliest mining camps of the territory in a few months. Smith and Christian are the fortunate discoverers of the coal beds at Fleming. An analysis of the coal gives 35 per cent carbon, and it is said to be coking coal. George Ceassidy will commence work with a force of men upon a group of claims adjoining

the old H. no. 9 mine in Hanover district, on Monday. The same character of copper ore as that of the old Hanover mine, which is owned by King Catron of Santa Fe, is known to exist upon Ceassidy's claims, and he intends mining it and disposing of the same to the Socorro and Denning smelters. The one-fourth interest owned by James Cunningham in the Billard's Peak coal strike, was purchased on Saturday last by Hon. H. H. Whitehill and Joseph Bell, of this city. Development work is rapidly progressing on this property with satisfactory results. Apache camp, near Eureka, is developing some important mineral discoveries of late. The Datsy, owned by Dennison and Schachman, promises to become one of the leading properties of Grant county. It shows an immense body of ore of good grade. About 125 tons of shipping ore have been already produced and from what is in sight a steady product of several tons daily can be maintained without difficulty and in doing development work only. A carload will shortly be shipped to the Benson smelter, that will by sample tests already made, average upwards of \$700 per ton. The Dandy is the name of a new strike in Apache camp, and is owned by Wm. Moore. Where first struck at the surface the ore, which is from six to eight inches in width returned from 800 to 1,300 ounces per ton. Aside from this rich streak there is in the same vein between three and four ft. of ore that will average from 40 to 50 ounces. The silver at Apache camp is found as a chloride, usually in a gangue of decomposed siliceous iron and is readily susceptible of treatment by the ordinary milling process. Some lead is also found, but where it exists in quantity it can easily be assorted out of the dry class of ore, the latter class predominating as a rule. A good future is assured this promising young camp when once its prospects are developed to the point of continual production.

WORK COMMENCED.—Silver City *Enterprise*, April 25: Work was again commenced on the Old Man mine at Fleming, on Monday morning last, and we understand will be continued without interruption during the summer. The force at work at the present time is small, but will be increased as the work demands it. The property is said to be looking better at the present time than it ever did in the past. Work will be commenced in a few days upon a group of claims near Fleming, recently sold by Black & Mullen to Mr. Anthony, of Denver. Mack Bros. & Powell are reported to have struck a three and a half foot vein of lead carbonate ore in their property in Hanover gulch that is looking well. From average tests recently made the ore is found to run 60 ounces in silver. The property is reported to be the best in that vicinity if not in the county. Georgetown is very dull just now, but its prolific mineral resources render a revival of business there and a prosperous future as certain as fate. Kingston looks prosperous and wears the general aspect of a mining camp whose people have no doubts as to its permanent prosperity. The recent staving up of the smelter has rendered business of all kinds more brisk. Men who were disappointed in obtaining situations at the "blow-in" found employment as teamsters in hauling ore from the King mine at \$2.35 per day. Contractor Gregg is going to construct a new road from Kingston to Lake Valley. Owners of claims in Hanover Gulch and other points in the vicinity of Georgetown, have nearly all completed this year's assessment work. Development work is being done on some of the claims. Business is quite lively at Lake Valley and yet there are a good many idle men there.

UTAH.

REVIEW.—Salt Lake *Tribune*, April 23: The week has been an exceedingly quiet one in the mining business. The storms continued, the roads are still blocked by snow and mud, and the canyons are all difficult and many impossible of passage, as far as transport of ore is concerned. The receipts of bullion in this city for the week ending April 23d, inclusive, amounted to \$74,464.91. There were no receipts of ore, the President, from which most of such receipts come, being unable to ship on account of the roads. The week before the receipts in this city were \$108,987.98 of bullion. The shipments from this city for the week ending the 19th instant, inclusive, were 2,022,677 pounds. The receipts from the Horn Silver for the week were ten cars of bullion—\$30,000. Total shipments to date, reckoned by our daily reports, \$657,000. We hear nothing more of the raid made by New York journals on the Horn Silver, and no more gloomy predictions in regard to its dividend capacity. The Ontario sent during the week 28 bars of bullion, valued at \$34,764.91. Total product for this year to date, \$532,846.08. The Ontario is in a highly prosperous condition, and has abundant ore resources. The product of Hanauer smelter for the week was five cars of bullion—\$9,700. There are getting to be very large accumulations of ore in the bins at Alta, and when the tramway begins to operate in the spring, it will bring down a silvery stream that will materially enlarge the current production. At Bingham the old stand-bys are producing well, and will continue to do so. Some very promising new mines will also be heard from favorably in ore output the present season. The week has been one of storms and difficulties, but the spring preparations go on about as usual. The miners who wintered in the city have quite generally gone again to the hills, and will not be seen till next fall. They will soon begin to be heard from in the ore and bullion product.

NEW PLACER DISTRICT.—Park *Mining Record* April 26: A meeting of miners was held at Lambert's cabin, on the South Fork of the Provo river, on Tuesday, April 22, 1884, for the purpose of forming a placer mining district. It was resolved that the district be named the South Fork Mining district. The following boundaries were adopted: Commencing at the mouth of what is known as Bridge Hollow; thence running southerly up said hollow to the dividing line between Uintah and Wasatch counties; thence northerly along the said dividing line to the junction of Summit and Wasatch counties; thence down the north fork of the main river to the point of beginning—all situated in Wasatch county, Territory of Utah. The same being about twenty miles in an easterly direction from Heber City, the county seat of Wasatch county, Utah. Thos. P. Potts was unanimously elected Recorder of said district.

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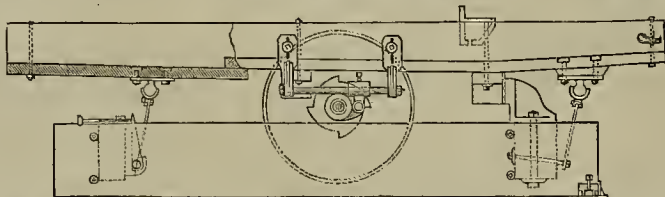
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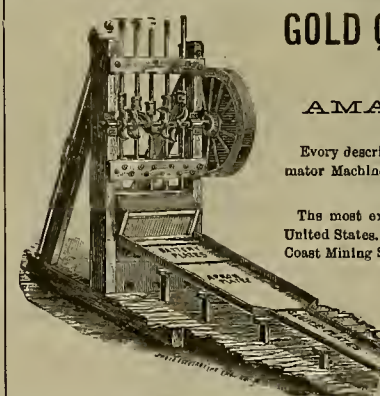
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Mining Share Market.

During some portions of the week the market has been in an excited state. The sales of Hale & Norcross went up into the thousands of shares. Our stock tables show the variations in this and the other Comstock mines, most of which participated in the movement. The most startling news of the moment is that of the closing down of the Grand Central mine at Tombstone, on the 30th. Shortly after shutting down, a newspaper representative interviewed Supt. Gage as to the cause of the stoppage. He stated that for the past four months the ore bodies above the water line had been growing poorer in grade until battery samples would not average \$20 per ton. Last month the loss to the owners was \$23,000. No work could be done below the water level for the reason that the pumps could not control the water. At the present rate of wages—\$4 per day—the mine could not pay expenses, and the company would not run at a loss any longer. The Miners' Union here positively refuse to work at \$3 per day—the proposed reduction—and unless a compromise can be effected, the probabilities are the mine will remain closed until new pumps are put in, which will be in about six months. It is said that both the Contention and Toughnut will close in a few days.

Bullion Shipments.

Hanauer, April 21, \$3,850; Horn Silver, 22, \$9,000; Hanauer, 24, \$2,100; Ontario, 22, \$14,832; Horn Silver, 22, \$20,832; Ontario, 23, \$5,177; Stormont, 25, \$3,690; Hanauer, 25, \$3,850; Horn Silver, 25, \$6,000; Ontario, 25, \$5,156; Ontario, 26, \$5,276; Horn Silver, 26, \$3,000.

Subscription Price Reduced.

The MINING AND SCIENTIFIC PRESS, Dewey & Co., publishers, San Francisco, is the representative mining journal of the Pacific coast, and worthy the support of all whose interest it steadily advances. The new terms are very low, and within the reach of the poor, struggling prospector as well as rich mine owner—\$3 per annum, paid for in advance.—*Mountain Messenger, Donoville.*

Stock and Grain Land.

Parties wishing to purchase good stock raising lands unaffected by severe droughts, will do well to address the undersigned. The lands can be purchased cheap, in lots from 100 to 2,000 acres. It is partly low table and rolling land, partly clear and level. Good for vine and fruit raising. Will raise vegetables and all kinds of grain. Crops certain every year. Near town and a \$10,000 public school house. Price, \$3 to \$5 per acre. Good local market for fruit, vegetables, grain, poultry and dairy produce. Address the proprietor,

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Anderson, Santa Co., Cal.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTLETT—Sacramento county.
A. S. DENNIS—San Mateo county.
A. C. KNOX—Yolo and Napa counties.
W. R. McQUIDDY—Tulare county.
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JOHN H. STURCKE—Santa Clara county.
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J. W. RILEY—Merced and Stanislaus counties.
Geo. McDOWELL—El Dorado and Amador counties.
WM. PARSONS.

New Incorporation.

The following company has been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

RUSSELL REDUCTION AND M. Co., April 25. Object: To purchase own and work gold mines, to purchase work subunit or other rebellious ones in the immediate vicinity of West Point by the Russell process, at a point on the east bank of Bear creek, Calaveras county. Capital stock, \$10,000,000, in 100,000 shares of \$100 each. Directors, E. F. Russell, W. J. Shives, Wm. H. Jeffers, J. Morizio, San Francisco, and E. T. Barber, Oakland.

Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Works Company, 111 and 113 First street, a Rutherford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below costs, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. References as to above can be had upon applying to this office.

The necessity of practicing economy is keenly felt by many at this time, and it is fortunate that there are places where one can buy a good article at a low price. The California Furniture Manufacturing Company, 228 Bush street, are selling bedroom sets from twenty-four dollars upwards, and other furniture at equally low prices. Their goods are first-class.

Lost Papers.

If any subscriber fails to receive this paper promptly, after making due notice at the Postoffice, he is urgently requested to notify this office by letter, that we may send the missing papers, and, if possible, guard against further irregularities.

REMITTANCES to this office should be made by postal order or registered letter, when practicable. Cost of postal order, for \$15 or less, 10 cts.; for registered letter, in addition to regular postage (at 3 cts. per half ounce), 10 cts.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journal.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co.	Nevada.	23.	50.	Mar 27.	May 22.	W H Watson.	302 Montgomery st
Andes S M Co.	Nevada.	24.	25.	Apr 18.	May 19.	J B Burris.	309 Montgomery st
Argenta M Co.	Nevada.	17.	10.	Apr 16.	May 20.	E M Hale.	327 Pine st
Best & Belcher M Co.	Nevada.	29.	50.	Apr 15.	May 21.	J W Willis.	309 Montgomery st
Belle Isle M Co.	Nevada.	7.	20.	Mar 12.	Apr 17.	J W Willis.	310 Pine st
California M Co.	Nevada.	11.	20.	Mar 14.	Apr 21.	W H Watson.	309 Montgomery st
Con Virginia M Co.	Nevada.	20.	20.	Mar 12.	Apr 16.	G P Gordon.	309 Montgomery st
Chollar M Co.	Nevada.	13.	50.	Apr 21.	May 23.	A W Havens.	309 Montgomery st
Daisy Cement M Co.	California.	1.	3.	Mar 27.	May 21.	W E Dean.	309 Montgomery st
Dayton M Co.	Nevada.	1.	20.	Apr 16.	May 20.	C J Collins.	512 Montgomery st
Excelsior Water Co.	California.	9.	20.	Jan 29.	May 14.	D C Bates.	309 Montgomery st
Gould and Curry M Co.	Nevada.	47.	50.	Mar 7.	Apr 11.	H B Wheaton.	215 Sansome st
Independence M Co.	Nevada.	13.	20.	Mar 12.	Apr 16.	A K Durbrow.	309 Montgomery st
La Grange Ditch and M Co.	California.	8.	50.	Mar 31.	May 5.	J W Willis.	310 Pine st
Lady Washington M Co.	Nevada.	4.	10.	Apr 10.	May 9.	W H Watson.	302 Montgomery st
Lake County Quartz M Co.	California.	8.	12.	Mar 10.	Apr 16.	W H Watson.	430 California st
Mexican G M Co.	Nevada.	26.	50.	Apr 16.	May 20.	C E Elliott.	309 Montgomery st
Mumich M Co.	California.	8.	15.	Mar 31.	May 9.	W V Letts Oliver.	328 Montgomery st
Mammoth Bar M Co.	California.	5.	15.	Mar 14.	Apr 18.	J W Willis.	310 Pine st
Opit M Co.	Nevada.	47.	100.	Apr 3.	May 3.	E B Holmes.	309 Montgomery st
Fugot Sound Iron Co.	Washington.	7.	1.00.	Mar 12.	Apr 27.	A Halsey.	323 Montgomery st
Peerless M Co.	Arizona.	1.	25.	Apr 8.	May 17.	J S Jordan.	309 Montgomery st
Rainbow G M Co.	California.	10.	10.	Apr 15.	May 16.	J S Jordan.	311 Montgomery st
Savage M Co.	Nevada.	59.	50.	Apr 5.	May 8.	E B Holmes.	309 Montgomery st
Sierra M Co.	Nevada.	3.	05.	Apr 15.	May 19.	C V Hubbard.	310 Pine st
Sierra S M Co.	Nevada.	48.	1.00.	Mar 21.	Apr 28.	W G Pratt.	306 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Con Imperial M Co.	Nevada.	W E Dean.	309 Montgomery st.	Annual.	May 7
Earl Play M Co.	California.	J B Burris.	310 California st.	Annual.	May 5
Indian Spring Drift M Co.	California.	A B Paul.	328 Montgomery st.	Annual.	May 3
Justice M Co.	Nevada.	R E Kelley.	419 California st.	Annual.	May 5
Morgan M Co.	Nevada.	O L Tilden.	806 Market st.	Annual.	May 3
Original Hidden Treasure M Co.	Nevada.	D A Jennings.	401 California st.	Annual.	May 6

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D O Bates.	309 Montgomery st.	25.	May 15
Bodie Con M Co.	California.	G W Sessions.	309 Montgomery st.	50.	May 5
Bulwer Con M Co.	California.	V Willis.	309 Montgomery st.	25.	Jan 23
Contention Con M Co.	California.	D O Bates.	309 Montgomery st.	25.	Jan 12
Debec Blue Gravel M Co.	California.	T Wetzel.	522 Montgomery st.	10.	Mar 15
Idaho M Co.	California.	D O Bates.	309 Montgomery st.	4.00.	Apr 2
Jackson M Co.	California.	D O Bates.	309 Montgomery st.	10.	Mar 15
Paradise Valley M Co.	Nevada.	W Letts Oliver.	328 Montgomery st.	10.	Apr 15
Standard Con M Co.	California.	J W Willis.	309 Montgomery st.	25.	Mar 12
Syndicate M Co.	California.	J W Stadfeldt.	419 California st.	10.	Apr 5

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 10.	WEEK ENDING APR. 17.	WEEK ENDING APR. 24.	WEEK ENDING MAY 1.
Alta.	1.50	1.55	1.25	1.35
Alta.	1.15	1.45	1.05	1.20
Andes.	.20	.25	.20	.10
Argenta.	1.00	1.15	1.10	1.05
Best & Belcher.	2.25	2.50	2.35	2.00
Bodie.	.55	.60	.45	.35
Bonanza King.	.15	.20	.15	.10
Belle Isle.	.15	.20	.15	.10
Bodie Con.	3.50	6.50	4.50	4.20
Benton.	.30	.35	.35	.30
Bodie Tunnel.	.55	1.05	.90	.80
Bulwer.	.05	.05	.05	.05
California.	.05	.05	.05	.05
Challenge.	.10	.75	.25	.25
Champion.	1.10	1.25	1.00	1.20
Chollar.	.10	1.25	1.00	1.20
Confidence.	.10	1.25	1.00	1.20
Con Imperial.	.05	1.00	.25	.25
Con Virginia.	.05	1.00	.25	.25
Con Pacific.	.15	.45	.35	.35
Crown Point.	1.35	1.00	1.25	1.40
Debec.	1.35	.90	2.00	2.00
Debec Valley.	1.05	4.10	1.15	4.25
Eureka Tunnel.	.25	.30	.30	.25
Excelsior.	.25	.30	.30	.25
Grand Prize.	.30	.35	.35	.25
Gould & Curry.	1.00	1.50	1.35	1.40
Goodshaw.	.05	.05	.05	.05
Hale & Norcross.	1.15	1.30	1.10	1.75
Holmes.	2.50	3.00	.20	3.00
Independence.	.10	.05	.05	.05
Idaho.	.15	.25	.20	.20
Justice.	.55	.60	.55	.10
Martin White.	.95	1.70	1.10	1.50
Mono.	1.20	1.40	1.10	1.75
Mexican.	.20	.20	.20	.20
Mt. Diablo.	.20	.20	.20	.20
Northern Belle.	2.50	2.70	2.35	2.50
Navajo.	.15	.15	.15	.10
North Belle Isle.	.10	.10	.10	.10
Oceidental.	.70	1.05	.45	1.00
Opit.	.20	.20	.20	.20
Overman.	.60	.75	.55	.80
Potosi.	.60	.75	.55	.80
Pinal Con.	.40	.60	.40	.50
Savage.	.40	.60	.40	.50
Seg. Belcher.	1.85	2.35	1.85	2.05
Sierra Nevada.	.25	.25	.25	.25
Silver Hill.	.50	.50	.50	.50
Silver King.	.50	.50	.50	.50
Scorpion.	.30	.30	.30	.30
Syndicate.	.10	.15	.15	.15
Tioga.	.10	.15	.15	.15
Union Con.	1.30	2.25	2.00	2.15
Uta.	.85	1.10	.75	.90
Yellow Jacket.	1.95	2.15	1.70	1.95

Sales at San Francisco Stock Exchange

THURSDAY A. M., May 1.	100 Yellow Jacket.	2.10	
500 Alta.	1.65@1.70	AFTERNOON SESSION	
100 Alpha.	1.25	1150 Alta.	1.70@1.75
1700 Bodie Con.	3.75	200 Andes.	.20
350 Benton.	.40@.45	50 Alpha.	.15
350 Bulwer.	.40@.45	90 Bodie.	.40@.45
40 Belcher.	1.15	100 Butte.	.50@.55
925 Chollar.	2.10	60 B. & Belcher.	1.85
100 California.	.25	650 Benton Con.	.40
340 Con Virginia.	.30	300 Crown Point.	1.35
200 Con. Pacific.	.25	125 Chollar.	1.60@1.65
150 Crown Point.	1.40	25 Confidence.	1.15
430 Excelsior.	.25@.30	300 Caledonia.	.30
100 Goodshaw.	.10	100 Con Virginia.	.25
640 Gould & Curry.	1.00@1.65	160 Eureka Con.	.40
5140 Hale & Nor.	2.30@2.35	50 Excelsior.	.25
510 Mono.	.60@.70	825 Gould & Curry.	1.45@1.50
1700 Mexican.	1.40@1.45	3600 Hale & Nor.	2.60@2.90
100 Navajo.	.20	20 Kentuck.	.75
100 Ophir.	.65@.70	150 Mono.	1.10
330 Overman.	.25@.30	250 Mexican.	1.30@1.35
700 Potosi.	.85	970 Ophir.	.60@.65
640 Sierra Nevada.	2.15@2.20	755 Sierra Nevada.	2.10@2.15
475 Savage.	.30	100 Syndicate.	.30
600 Syndicate.	.30	1000 Savage.	.60@.65
100 Scorpion.	.35	700 Scorpion.	.30
40 Silver King.	5.00	410 Union.	2.35@2.40
350 Union Con.	2.35@2.40	80 Utah.	1.75
20 Utah.	1.75	300 Yellow Jacket.	2.10

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Should this paper be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent.

Dewey & Co.'s Scientific Press Patent Agency.



OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

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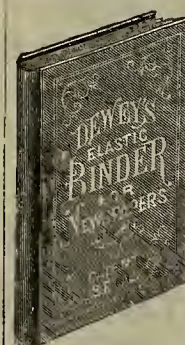
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A party with \$20,000 to purchase a third interest in a mine that has in it many a vein. On one there is a shaft 35 feet deep, in 4 feet of Silver King ore, assaying \$400 per ton. At the center there is a dike or rift in the belt of veins full 50 feet in width, that runs across the mine. Twelve feet from the center of this rift there is a shaft 23 feet deep, the bottom all in tale and white porphyry, streaked with veinlets of quartz specked with ore. This mine is 1 1/2 miles northerly from the Silver King mine, in an overlooked section of country, but is in the same formation that the Silver King is in. Half of the purchase money will be used in opening and developing the mine. The party accepting this offer will draw a prize equalled by none—yes, not even by the famous Silver King—for through it surely flows the Equator of the Silver Zone. For further information, address

SAM. THORPE,
Silver King, Arizona.



AN EASY BINDER.—A. T. Dewey's Patent Elastic Binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable, and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Publishing Co's. journals, Harper's Weekly and Scientific American, 85 cents; postage 10 cents. Postpaid to subscribers of this paper, 50 cents. Send to this office for illustrated circular. Agents wanted.

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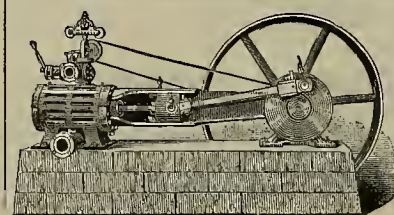
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING APRIL 22, 1884.

297,219.—LAD BOARD.—A. L. Anthony, Placerville, Cal.
297,127.—HEADER AND THRASHER.—S. L. Gaines, Stockton, Cal.
297,258.—APPARATUS FOR MAKING RINGS, COUPLING LINKS, ETC.—Silas Harris, S. F.
297,412.—PISTOL HANDLE.—J. C. Kellon, S. F.
297,470.—KEY TAG.—F. A. Knox, Woodland, Cal.
297,452.—PAWL FOR CABLE GRIP LEVERS.—Root & Tucker, S. F.
297,468.—TANK FOR WINDMILLS.—H. R. Stevens, Los Angeles.
297,317.—LAMP BRACKET.—A. Thurber, Concord, Cal.
297,327.—ANIMAL SHEARS.—W. F. Wickenden, San Luis Obispo, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through DEWEY & CO.'S SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ANIMAL SHEARS.—Wm. F. Wickenden, San Luis Obispo Co. No. 297,327. Dated April 22, 1884. This relates to that class of shears known as sheep-shears in which the blades are forced together against the resistance of a spring at their base where they are united and under the influence of which they are separated when the pressure is relieved. The invention consists in a new and useful means or device for holding its blades wider apart to afford facility in grinding them. This class of shears is made so that the blades remain normally open to provide for their cutting action in closing; but they are not open far enough to permit grinding. The present custom to accomplish a wider separation is to insert a cross-stick between their shanks. In this operation the difficulty of contending with a strong spring renders the insertion of the stick a matter of some trouble; but the greatest drawback is that while grinding the blades, the stick is liable to become loosened, and the blades, being released, come together and frequently cut the hand of the operator. The object of the invention is to provide a brace which is capable of easy adjustment and which will not slip.

TWO-WHEELED VEHICLE. James S. Creighton and Joseph Taylor, Smith's Flat, El Dorado Co., Cal. No. 295,361. Dated March 18, 1884. This is another device intended to overcome the "jogging" motion commonly imparted to two-wheeled vehicles by the movement of the horse. The inventors think that the best spring for these vehicles is the "platform spring," as it forms a better foundation than the ordinary elliptic springs. A different connection of the platform spring with the shafts of the body has to be made. They dispense with the usual cross-spring in front and connect the side-spring with the cross bar of the shaft by means of connecting strips. These furnish support, and a shackle-connection admits of their moving with the shafts without affecting the springs. This makes the conveyance easy riding, the jogging motion being avoided.

GATE OR VALVE.—Phillip Giovanni. No. 295,998. Dated April 1, 1884. This invention relates to certain improvements in valves of that description known as "straightway" valves or gates, and it consists of two disks having their outer faces formed to close against corresponding seats in the passage, and having double inclines upon their inner sides, either concave or convex, together with inwardly projecting lugs, which fit corresponding depressions in a central lug. This block has double-inclined surfaces to correspond with and act upon the inclines of the valves in closing or opening the same, and it is moved by a screw thread upon the stem or spindle.

KNIFE AND PEN HOLDER.—Isaac Phillips, Silver City, Idaho. No. 296,054. Dated April 1, 1884. This consists of an implement, the handle of which is an ordinary knife handle fitted with blades, and having in its back near one end a chamber in which a short pen and pen holder lie, the latter being pivoted to the handle in such a manner as to enable it to be opened out with its pen so that the handle of the knife will then form for it the staff when the implement is used in writing. A hinged casing or cover is adapted to receive the pen and its holder when lying within the chamber, whereby dust is kept out when the implement is carried in the pocket.

DOOR AND PANEL WORK.—Wm. N. Miller, Oakland, No. 296,035. Dated April 1, 1884. This invention relates to certain improvements in the manufacture of door and panel work. It has been difficult to construct good, substantial doors from soft and brittle woods, such as Oregon cedar and California redwood, on ac-

count of the difficulty in making good, substantial joints, and also because the edges or angles are easily bruised or broken. In this invention the stiles and rails are united by hard-wood dowel pins to form a joint. Narrow strips of hard wood are secured on the edges of the doors.

SAFETY CAR TRUCK.—Samuel Brown, S. F. No. 297,031. Dated April 15, 1884. This invention relates to that class of safety car trucks in which a suitable guard on the truck engaging with the rail on the road-bed prevents the car from jumping the track. The patent covers improvements on a former invention. The improvement consists in the means by which the safety clamp or guard is connected with the truck, and the construction and arrangement of the parts. The object of the invention is to attach the clamp or guard to the truck in the simplest, strongest and most direct manner.

TWO WHEELED VEHICLE. Wm. T. Goodman, Fulton, Sonoma Co., Cal. No. 296,049. Dated April 15, 1884. This is an invention for preventing the rocking motion imparted to these vehicles by the joggling of the horse. The improvements consist in the arrangement and connection of springs, the means for mounting the body thereon, and a novel connection between the springs, axle and shaft. In this cart the body may move readily independent of the springs to a certain degree. On account of the character of the springs themselves and the manner in which the body is hung, the vehicle is an easy riding one.

FAUCET.—Hugo Mattulath, S. F., assignor to Security Package Co. No. 296,031. Dated April 1, 1884. This is a screw-faucet, having a valve moving within it to close or open the outlet, a wheel and chambered sleeve fitting the exterior of the body and a screw cap, having smaller threads than those in the valve-stem, fits over the end of the faucet body and prevents the valves from being screwed entirely out. By this invention the faucet is first screwed on until properly sealed. The sleeve is then turned until the discharge-nozzle stands in the proper position.

GREEN CORN CUTTING MACHINE.—George A. Roberts, Walla Walla, W. T. No. 296,066. Dated April 1, 1884. This machine is one designed to cut green corn from the cob, or roasting ear, for canning and other purposes and known as "Green Corn Cutting Machine." It consists in a combination of devices, in which an expanding annular knife operates in conjunction with an impaling bar.

San Francisco Metal Market.

[WHOLESALE.] THURSDAY, MAY 1, 1884.

ANTIMONY—Per pound.....	14 @ 15
IRON—Glenbrook, ton.....	25 50 @
Eglinton, ton.....	24 50 @
American Wire Pig, ton.....	— @
Oregon Pig, ton.....	— @
Clippings, Nos. 1 to 4.....	32 50 @ 35 00
Refined Bar.....	34 @ 3
Horseshoes, keg.....	5 50 @
Nail Rod.....	7 00 @
Norway, according to thickness.....	7 00 @
ST. GAL—English Cast, lb.....	14 @ 15
Black Diamond, ordinary sizes.....	14 @
Drill.....	15 @ 16
Machine.....	12 @ 14
COPPER—Ingots.....	22 @
Brass—sized.....	33 @
Fire-box sheets.....	1 @
Sheet.....	17 @
Oil.....	8 @
Bar.....	— @
Cement, 100 lbs.....	12 @
LEAD—Pig.....	45 @ 4
Sheet.....	7 @
Hot, discount 10% on 500 lbs; Drop, 2 lb bag.....	2 10 @
Chilled.....	2 20 @
TIN PLATES—Charcoal.....	5 60 @ 5 50
Coke.....	5 50 @ 5 75
Terne.....	6 15 @
Australia.....	21 50 @
L. C. Charcoal Rodding, 14x20.....	6 25 @ 6 50
ZINC—By the case 7 to 10 lb. less the case.....	19 @
Sheet, 7x3 ft. 7 to 10 lb. less the case.....	9 @ 10
N. L.S.—Assorted sizes.....	3 25 @
QUICKSILVER—By the flask.....	34 @ 34 1/2
Flask, new.....	1 05 @
Flask, old.....	85 @

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Intelligent Boy Wanted

To work in a photograph gallery. Satisfactory references required. Fourteen to eighteen years of age preferred. Wages moderate at first. A country lad or one who lives at home in the city preferred. Apply at this office.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

A Good Chance for City Real Estate Investment.

The following property in San Francisco will be sold at low rates exceedingly favorable to purchasers who wish to buy for safe and profitable investment.

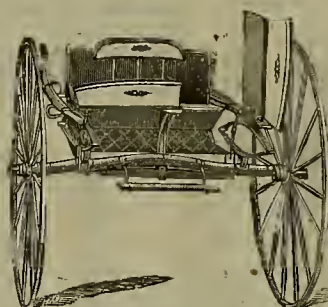
IN THE MAP, No. 3.—Northwest corner of Aztec street and California avenue, 3 lots, Nos. 84, 86 and 88. On the southwest corner of Aztec street and California avenue, 3 lots, Nos. 98, 100, 102, 104 and 106. On the west side of California avenue, between Hope and Tomasa streets, lot No. 1123. On the east side of Shakespear street, between Hope and Isabel streets, lot No. 1411. On the south side of California avenue, bounded on the other three sides by Bradford, Standish and Mayflower streets, 20 lots comprising a whole block, Nos. 1189 to 1209 inclusive.

IN THE MAP, No. 1.—Southeast corner of Islais Creek Channel and Chace street, 1 lot, Nos. 1969, 1970, 1971 and 1972. Northeast corner of Chace and Freedom streets, 5 lots, Nos. 1955, 1956, 1957, 1958 and 1959. South side of Napoleon street east from Bigg street, 2 lots, Nos. 2527 and 2528. North side of Tulare street east from Bigg street, 2 lots, Nos. 2543 and 2544.

Also 2 lots, Nos. 82 and 84, Oakland Homestead Association, situated near Lake Merritt, and on the easterly road to Piedmont, near the northwesterly limits of East Oakland. They are 50 feet wide by 100 feet deep, with extra land and frontage in one.

The owners themselves offer the above lots to actual purchasers at bedrock prices, and believe that no other property can be bought in the vicinity for immediate use or for investment on nearly as favorable terms.

Apply to, or address the office of this paper.



Adel's Patent Spring Shaft Driving Cart.

The Spring Shaft does away with the disagreeable motion of the horse, and the open seat affords easy and safe access from the rear. It costs less to ship, is Light and Stylish and easy riding.

Three men with Adel's Grain Elevator pile up in warehouse, or field, 1,500 sacks in a day. Address:

W. T. ADEL,
City Carriage Factory, San Jose, Cal.

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I know where there are immense deposits of Coal, worth millions of dollars. I need from \$2,000 to \$10,000, or more, to LOCATE, ENTER and IMPROVE said Coal Lands, much of which is upon Government Land. Any person having the money mentioned to invest, can make arrangements with the advertiser to go out with him and see with his own eyes the immense quantity and value of said Coal Lands. I am fully convinced that any party investing in said Coal Lands can, in less than two years, realize at least \$100 for every dollar invested. Any person possessing the requisite means and meaning "business," can address for two weeks, appointing time and place for interview,

A. B. "COAL,"
Care E. R. Robinson, P. O. Box 1474, San Francisco, Cal.
N. B.—The advertiser can show the very highest testimonials concerning integrity and business capacity, and can give good Real Estate Security for as much as \$5,000.

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Valuable Vault for Sale at a Bargain

A contractor has a thoroughly burglar-proof vault for sale. Dimensions, 4½x5 ft.; height, 7 ft. in the clear; weight, about 6,000 lbs. In perfect order throughout. Double doors inside. Single burglar-proof outside door, 1½ inch steel and iron combined. The bolt work is of superior and first-class quality in all respects, there being no better on this coast. Can be examined at any time. Write for further information. Address P. H., box 2361, S. F. P. O., or inquire at this office.

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Baths.
E. D. MOORE,
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WORKS ORE WET OR DRY.

Awarded SILVER MEDALS in 1882 and 1883
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Pumping Machine Works.
308 Mission Street, S. F., Cal.
By W. I. TUSTIN, Inventor and Patentee.
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18, 20, 22 AND 24 MAIN ST.

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Dealers in
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HARDWARE, IRON, STEEL,
PIPE, TUBES, ETC.
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EQUAL PARTNER WANTED.

For the State of California, to furnish means
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Best Amalgamator and Separator

Yet Invented. Patented Oct. 16, 1883.

Will work any material profitably it will pay to dig—
Black Sand and Pulverized Free-milling Ore.
Little water required; simple in construction; saves all
the gold, loses no quicksilver, and requires but a
small expenditure of money for immense re-
turns. Investigate, and address the inventor,

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—AT—
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Automatic Cut-Off Engine.
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Right or left hand; 10½x24 inch cylinder; fly wheel 3,500 pounds; nearly new and all in perfect order. Will be sold at a great sacrifice for want of use. Terms of payment easy; on installment plan, if desired. Original cost \$1,200. Can be seen in position any day. Address H. M., box 2301, S. F. P. O.

SURVEYORS—INVENTORS.

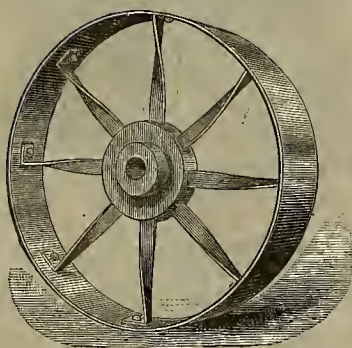
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Maker, 335 Bush street, S. F. Scientific Apparatus and
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Advantages of these Pulleys.

They are less than half the weight of cast-iron pulleys; are polished on the face; are made either crowned or straight, and are turned in the lathe the same as the best make of cast-iron pulleys.

They are carefully balanced. They are subject to no contraction strains, and can be run at very high speed without danger of bursting.

On account of their great lightness and the form of the arms, they absorb less power than any other pulley.

They are the only pulley of the kind which runs true. They cannot be broken in transport.

TESTIMONIAL:

MATHER LANE SPINNING CO. (Limited),
LEIGH, ENGLAND, NOV. 5, 1883.

N. Macbeth, Esq.—Dear Sir: The Patent Steel Pulleys supplied throughout to our No. 2 Mill are working to our entire satisfaction.

They are very true, and are about 50 per cent lighter than the cast-iron pulleys in our No. 1 mill.

Yours faithfully,

For the Mather Lane Spinning Co. (Limited),
[Signed:] RICHARD T. MARSH,
Managing Director.

Risdon Iron & Locomotive Works,

Sole Manufacturers and Agents for the
Pacific Coast,

S. E. Cor. Beale & Howard Sts., San Francisco.
Send for Circular and Prices.

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MANUFACTURERS OF

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Kind of Machinery for Mining Purposes.

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Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
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All kinds of Brass, Composition, Zinc, and Babbitt
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HEINE PATENT SAFETY BOILER,
RISDON IRON AND LOCOMOTIVE WORKS,

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Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

TESTIMONIALS.

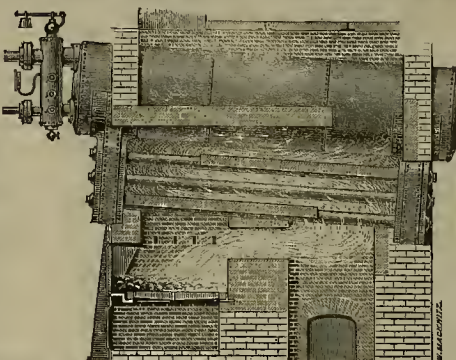
St. Louis, Mo., Sept. 23, 1883.

Messrs. Adolphus Meier & Co.—GENTLEMEN: We cheerfully certify that the "Heine Patent Safety Boiler" put up by you in our establishment has proved very satisfactory in its working. The chief points of excellence in the "Heine Safety Boiler" are its economy in fuel and space, freedom from scaling, aptitude for power and heating purposes, working equally well with clear and muddy water. We warmly recommend it to all using steam machinery. Yours truly,

ANHEUSER-BUSCH BREWING ASS'N.

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To Mr. H. Heine, Civil Engineer: In reply to your inquiry of September 24, we respectfully inform you that the three boilers built under your patents, under steam since September 25, 1881, at the Alexander Place Depot, as well as the two at Friedrich Strasse Depot, under steam since September 22, 1882, have given good satisfaction, requiring no repairs whatsoever to date. The internal cleaning of the boiler was always accomplished



with ease on account of the convenient arrangement of the tube caps, the adhesion of scales being firmly prevented thereby, and the boilers kept in prime condition.

(Signed): BRAUCKE.

Send for Circular and Prices.

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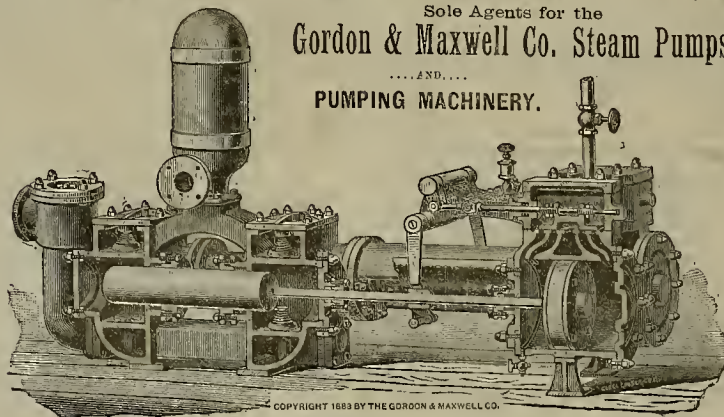
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THE CHEAPEST AND BEST

STEAM PUMP for Lifts from 10 to 70 ft.
FOR IRRIGATING PURPOSES

And all General Work where a Simple
Durable Pump is Required.

NO VALVES! NO PISTON!
NO OIL REQUIRED!

Can be Run by a Child.

EACH PUMP GUARANTEED.

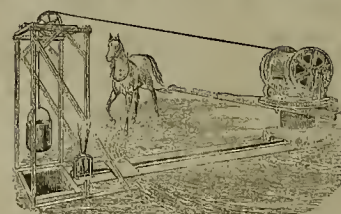
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THE MOST EFFICIENT AND PRACTICAL MACHINE
ever invented for the service of Prospectors and
others requiring the use of a Horse Power; possessing all
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for the continuous operation of a Pump or Blower without
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It is made entirely of Iron; no piece weighs
over 250 pounds. At the ordinary speed of a horse a
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of the man at the shaft, and is capable of carrying 500
feet of five-eighths steel rope. The cost of erection is
slight, as two men in half a day can easily put it in place
ready for work.

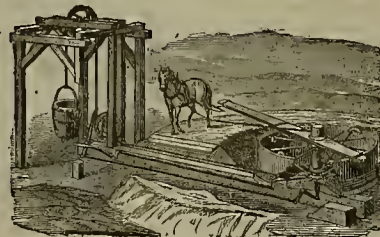
While this power is more particularly for mining pur-
poses, it is equally adapted to all other uses where animal
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ONE HORSE CAN EASILY HOIST OVER 1,000 LBS.
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120 in Actual Use.

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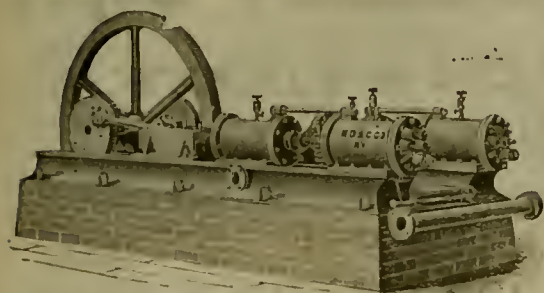
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Anyone, upon examining, will proclaim to be far superior to anything yet offered to the MINING PUBLIC in the shape of a ROCK DRILL.

CALL AND SEE IT OR SEND FOR CIRCULARS.

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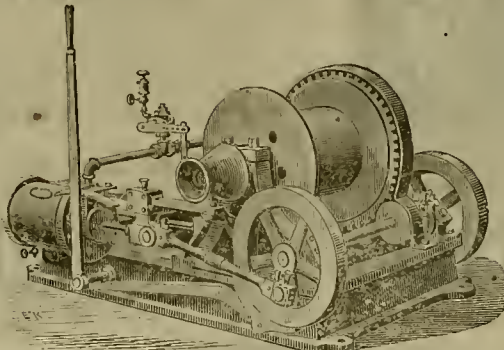
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The Korting's Injector is the simplest, cheapest and best in use. Will draft its own water, hot or cold, and feed under varying pressure. Send for Circular.

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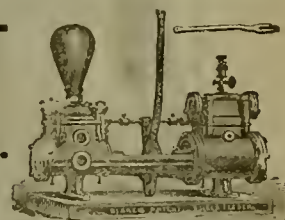
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Hoisting Engines of all Kinds.

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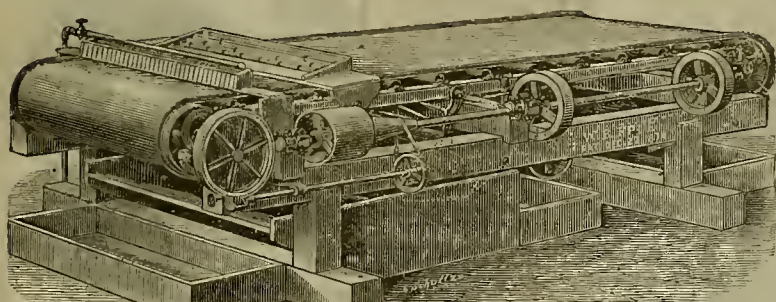
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BLAKE STEAM PUMP.
More Than 16,000 in Use.

**\$1,000 CHALLENGE!****PRICE REDUCED,**

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**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal.
A machine can be seen in working order and ready to make tests at the office of Hunkley, Spiers & Hayes, No. 220 Fremont Street, San Francisco.

To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringers.

That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER. Agents Frue Vanning Machine Co.

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

January 3, 1884.

L. C. MARSHUTZ.

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National Iron Works,

Northwest Cor. Main and Howard Sts., San Francisco,

MANUFACTURERS OF

IMPROVED PORTABLE HOISTING ENGINES**At Greatly Reduced Prices.**

HOME INDUSTRY! ALL WORK TESTED AND GUARANTEED! Stationary and Compound Engines, Flour, Sugar, Quartz and Saw Mills. Amalgamating Machines.

CASTINGS AND FORGINGS OF EVERY DESCRIPTION.

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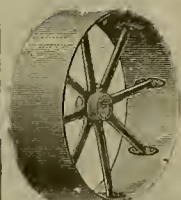
**JENKINS PATENT VALVES.****Gate, Globe, Angle, Check and Safety.**

Manufactured of BEST STEAM METAL. We claim the following advantages over all other Valves and Gate Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.



PAT. OCT. 25, 1881.

Reliance Machine Works,**CLOT & MEESE,**

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

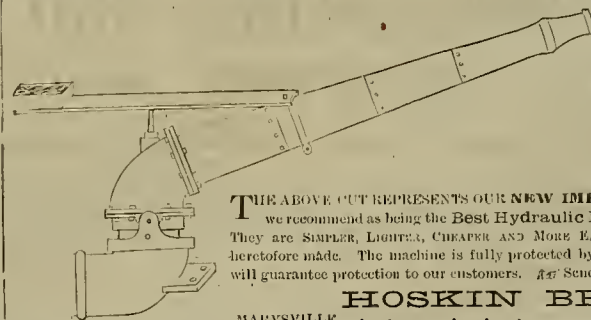
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

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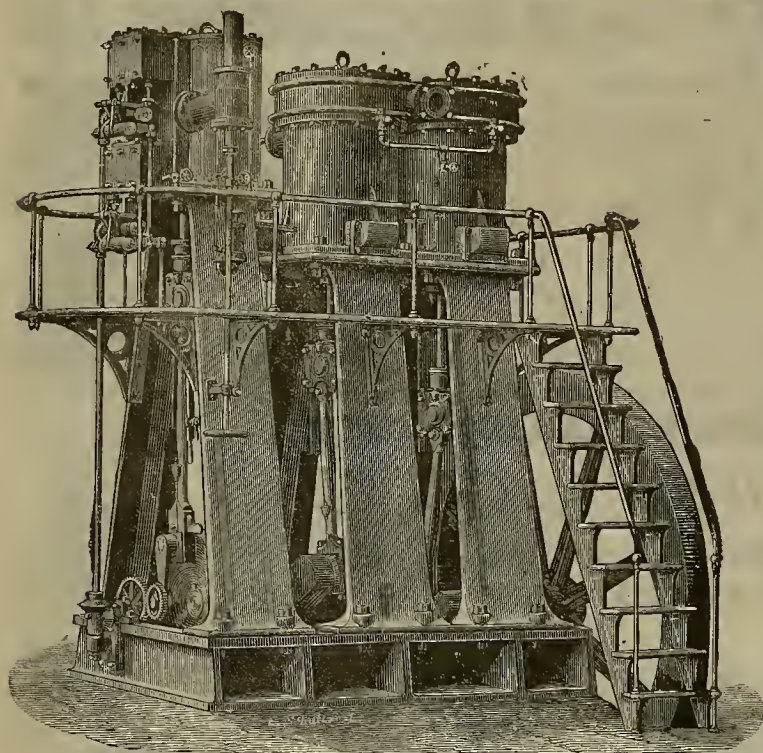
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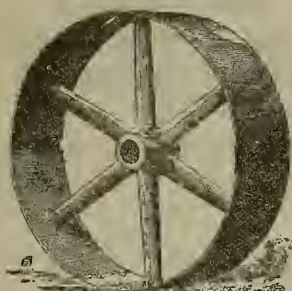
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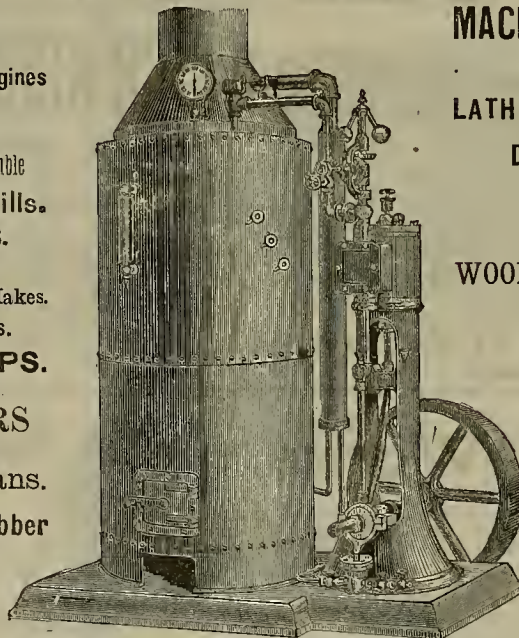
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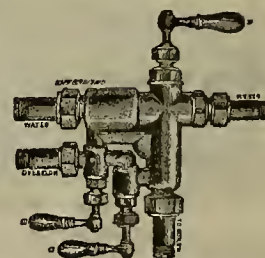
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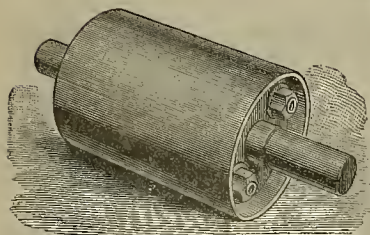
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Preface; Introduction; Implements, Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, MAY 10, 1884.

VOLUME XLVIII
Number 19.

Standard Time.

The accompanying map, designed to make plain the standard time now adopted by all the railway companies of the United States, was prepared by Rand, McNally & Co, the well-known map publishers of Chicago. Heretofore the railroad trains have been run under fifty-three different kinds of time; the number is now reduced to five, as follows: Inter-colonial, embracing Nova Scotia and New Brunswick; Eastern, embracing the New England States;

time of the Greenwich Observatory, London, England, and as the longitude in which their roads were situated was so many times fifteen degrees westward from Greenwich, they made their standard of time that many hours slower than Greenwich time. Hence the 60th degree of longitude is four hours slower than Greenwich time; the 75th, five hours slower; the 90th, six hours; the 105th, seven hours; and the 120th, eight hours—thus making five different standards between the Atlantic and Pacific oceans. These five standards are shown on the map in

minutes and seconds between the solar time of those towns and the standard time:

M. S.	MOUNTAIN TIME.
5 4	slower than Deadwood, D. T.
16 56	slower than Bismarck, D. T.
22 50	faster than Fort Benton, M. T.
27 46	faster than Virginia City, M. T.
1 12	slower than Cheyenne, W. T.
27 26	faster than Salt Lake City, Utah.
11 27-15	slower than Denver, Col.
5 4	faster than Leadville, Col.
4 40	faster than Santa Fe, N. M.
23 40	faster than Tucson, Ari.
24 44	faster than Prescott, Ari.

New Miner's Pick.

Dock E. W. Taylor, who has been mining and prospecting in the State for a good many years, has invented, and applied for a patent on a peculiar miner's pick. The head has sockets formed in opposite sides to receive the points, which may be removed at will. There is also a socket for the handle, with wedges at the inner end or base, by which to fix the handle in place. The inner ends of the points are formed so as to fit and wedge into the sockets in the head.



MAP SHOWING THE DIFFERENT DIVISIONS OF STANDARD TIME.

New York, Pennsylvania and the States south of Pennsylvania; Central, including Illinois, Ohio, Indiana, Missouri and the States north and south of them; Mountain, comprising the roads west of the Missouri river in the mountains; and Pacific, embracing the lines on the Pacific coast. Could we have printed the maps in five colors the divisions would be better shown, but the shading renders them sufficiently distinct for our purpose. The time in which the earth makes a revolution was long ago divided into twenty-four parts known as hours, and in measuring distances around the earth from east to west the circumference of the globe has been divided into 360 parts, or degrees of longitude. The surface of the earth travels, therefore, as many degrees in one hour as 24 is contained in 360, which is 15. Hence the difference in time between each succeeding 15 degrees of longitude, faster toward the east and slower towards the west.

The railroad officials of the continent decided to adopt as their standard of regulation the

the order mentioned at the top of the map.

The 90th meridian, on which Central time is based, is nine minutes slower than Chicago solar time. The 75th meridian, which gives Eastern time, is one hour faster than Central time, or four minutes slower than New York City solar time. Inter-colonial time, being based upon the 60th meridian, is two hours faster than Central time. Mountain time, which is based upon the 105th meridian, is one hour slower than Central time. Pacific time, based upon the 120th meridian, is two hours slower than Central time.

The several meridians are indicated upon the map, as well as the territory included in the different divisions. The irregularity in the boundaries is caused by the various roads wishing to adopt as their standard the time of the meridian nearest to which the greater number of their lines are situated.

We are on this coast more particularly interested in the Mountain and Pacific standards. The following tables show the difference in

1 23-15	slower than Chihuahua, Mex.
20 52	faster than Guaymas, Mex.

PACIFIC TIME.	
12 0	faster than Olympia, W. T.
9 50	faster than Portland, Or.
14 40	slower than Boise City, Idaho.
1 40	slower than Virginia City, Nev.
9 37	faster than San Francisco, Cal.
55 14	faster than Sacramento, Cal.

THE MECHANICS' FAIR.—The Board of Managers have resolved on some changes in the Pavilion which will afford increased space for exhibits. Many machinery exhibits were crowded out last year. It has been decided to take half of the garden and add it to the main floor. J. H. Gilmore, Superintendent for so many years, again enters on his duties next Monday, and promises, on account of the favorable indications of the season, that this fair in the character of its exhibits shall be equal to any preceding one. The fair this year will close on September 6th, thus allowing exhibitors to also appear at the State Fair at Sacramento.

At the bottom of each socket is an incline which narrows this part of the socket, so as to cause the shank of the pick arm to wedge firmly into place, and seat themselves by the stroke.

An angular hole is made through the head, cutting the diaphragm between the uniting ends of the shanks transversely to them and in the side opposite the incline. A wedge or key is driven into this opening, when it is desired to force the shanks out of the sockets. The opening or socket for the handle is made somewhat wider at the bottom or inner end than at the outer end, and has wedge-shaped projections, which enter the end of the handle when it is driven home and expanded in the socket, so as to retain it firmly in place. From the handle-socket to the edges of the point sockets are concave curved edges, which are also sharpened to an edge and these serve to cut or break roots when the pick sinks so deep that they strike. The whole device makes it easy to renew or sharpen the points when necessary, and to retain the handle firmly in place.

CORRESPONDENCE.

We cannot, unendorsed, opinions of correspondents.—Eds.

The New Copper Assay.

[Written for the Press, by C. H. AARON.]

Where assays are "few and far between" it is not convenient to keep a standard solution for volumetric determination. I find that the new assay of copper, by means of potassium zanthate, may be made gravimetrically.

The solution is to be prepared as heretofore directed for the volumetric assay, and the copper precipitated by a slight excess of potassium zanthate. The precipitate is to be filtered out and washed, first with water and then with alcohol, until the drippings no longer become turbid on addition of water; it then dries readily on the water-bath, and contains 33 per cent of copper.

This agrees with the formula $2\text{CuO}, \text{C}_4\text{H}_5\text{O}, 2\text{C}_2\text{S}_2$ being a basic zanthate containing, theoretically, 32.95 per cent of copper.

If the precipitate is washed with hot water only, the drying is almost interminable, and it is difficult to bring it above 32 per cent copper.

The potassium zanthate, by long keeping, may become slightly alkaline, and then produces a precipitate which is rather red or brown than yellow. It is only necessary, in this case, to use a sufficient excess of ammonia in the solution. The precipitate, if not yellow at first, soon becomes so.

In the case of cobalt being present, I find that the separation of the copper by precipitation with zinc is doubtful. Zinc precipitates a part of the cobalt from neutral or slightly acid solutions. It will therefore be better to use iron, or the copper (and other metals) may be separated by means of hydrogen sulphide, or the process by sodium hyposulphite may be used when the solution is suitable; the precipitated copper sulphide, or sub sulphide, being redissolved and determined by the zanthate method, either volumetrically or gravimetrically.

The Comfort of Miners.

EDITORS PRESS:—It seems to be generally considered by most mining superintendents that a hired man is something analogous to a mule, that no labor ought to fatigue him; that no hardship will injure him, and so long as he gets plenty to eat and has a place to roll over he will get up good as new. A little reflection and observation will show that this is all a mistake; even a mule will get stiff and rheumatic by long and continued exposure, and will not "get down into his collar" as willingly as one better cared for.

A sound, active and healthy man is better able to work and give value received for his wages, than one who has the rheumatism in his shoulders, or the lumbago in his back, or who is continually choked up with a cold. Miners as a rule are very appreciative of anything done for their comfort and tending to promote their health. No one employing them loses anything by obtaining their good will.

If a mine is so arranged that immediately upon coming out of the shaft, or tunnel, the men can step into a dry, warm "changing room" provided with a tank for washing, and a large stove for drying wet working clothes, men employed in such a mine will work up to a few minutes of "quitting time," while on the other hand, if upon leaving work they have to change their clothing in the blacksmith shop, or the lee side of a wood pile, subjected to drafts and chilling winds, they will begin to "taper off" an hour earlier, perhaps, than they otherwise would.

The reason is obvious, for no matter how dry and well ventilated a mine may be, the air underground is more or less stuffy and close, and hard labor in such an atmosphere induces excessive perspiration, which, if suddenly checked, is almost certain to result in colds, and some form of rheumatic lameness. Therefore, unless the miner knows he has a good warm room in which to change his wet working clothes for dry ones, he would be foolish indeed not to commence easing off an hour or more before the time approaches for quitting work. An hour lost on each man's work amounts to something in a year's time. The importance of comfortable "changing rooms" is well understood on the Comstock Lode; without them it would be impossible to get men to work the deep mines. Some of the Virginia City changing rooms are quite elaborate affairs. Many owners of wet and cold mines find it a difficult thing to keep first class miners employed more than a few weeks at a time. An examination of the facilities for changing and drying clothing might often give a good hint as to the cause. A few nails driven into the wall above the boilers, and a couple of loose boards laid across, is a very poor apology for a changing room. At the best, but a few men can change comfortably, and the choice places are usually monopolized by some "pet" or "old hand," while the majority of the men burn on one side and freeze on the other. At first sight this may seem a trivial subject, but if those interested will look into the matter as the writer has, they may see something in it. In conclusion, take as good care of your men as you do of your pet horse; see that they are well cared for and you will be more than repaid by increased service.

CHAS. L. LANG.

Sonora, Tuolumne Co., Cal., April 20th, 1884.

Metallurgy of Nickel.

The recognition of nickel as an element dates no further back than the year 1751, when the Swedish mineralogist so far separated it from its combinations as to ascertain some of its properties and justify him in describing it as an element. It had before that time been found as a troublesome residue, but was supposed to be a mixture of cobalt and copper with arsenic. According to Bergman, Hiérne was the first to write of "kupfer-nickel," in a work upon minerals published in Sweden, in the year 1694. It was not only obscure, but was troublesome and thought to be destructive of copper.

Being generally in close association with cobalt, this troublesome substance was left as a residue or by-product when cobalt ores were treated to obtain the oxide of cobalt for staining glass or producing a blue color on porcelain. The nickel was found concentrated in the cobalt speiss left in the pots when smalt was manufactured. This speiss contained other metals, such as copper and iron, besides sulphur and arsenic. The nickel, was not therefore, in a pure state, and for a long time its valuable properties were unknown, although the impure alloy was largely utilized to make the alloy commonly known as "German Silver," "*Argent de Berlin*," "*maillechort*," or "nickel silver." The impure nickel, or nickel-bronze, thus carried with it into the nickel-silver all its noxious associates, and the quality of the product was impaired, being often hard brittle and intractable. Even one per cent. or less of arsenic was sufficient to greatly modify the physical properties of the nickel or the alloys made from it. It was difficult to free the nickel from such small quantities of impurity. It resulted that nickel was for a long series of years unknown, commercially, in a state of purity.

The scientific chemists, however, succeeded in preparing small samples of the metal sufficient to experiment with and to determine its true physical properties. The results were at first somewhat contradictory, as we should expect from our present knowledge of the sensitiveness of the metal to minute quantities of either carbon or hydrogen in combination, very much as iron is affected and its properties modified by mere traces of some of the elements. For example, Richter found that nickel oxide, strongly ignited in an earthen crucible with carbon, gave the metal in a perfectly malleable, ductile condition. When so prepared it could be hammered cold or hot into plates 1-100 of an inch in thickness, and could be drawn into wire 1-50 of an inch in diameter. The malleability of the nickel was found to be impaired by carbon or manganese. Another experimenter, Tuppitt, found that nickel reduced in the presence of carbon, in a covered charcoal crucible, and under glass, formed more or less nickel-graphite, absorbed a portion of carbon, and became less ductile than zinc. The metal so produced was brittle when cold, and was as fusible as cast iron, while the metal obtained by Richter was difficult of fusion. He also noted that nickel could be welded, but Tousté found that it welded imperfectly. Deville recognized the useful physical properties of both cobalt and nickel, such as malleability, ductility and great tenacity. He showed that these metals could be worked at a forge with the same facility as iron; that they were susceptible of being employed in the same manner, and that they were less oxidizable. The facts are important to any review of the progress of the metallurgy of nickel, particularly as it will presently be shown that the metal in a state of purity was first commercially wrought into useful objects in the United States.

The influence of nickel in its alloy with iron has been brought into special notice by reason of the mingling of these two metals in various proportions in meteorites. The occurrence together of iron ore and nickel terrestrially has already been noticed. At the New York exhibition in 1853 the nickeliferous ores and iron, in addition to those from North Carolina, were from Marquette, Michigan, and were exhibited by Mr. Thurber, of Detroit. The percentage of nickel was small, but it is stated that the forging iron made from this ore by the Catalan forge process had some remarkable properties; it contained nickel, but the percentage is not stated. It had a silvery white appearance and received and retained a high polish. It has been noted by Faraday that iron alloyed with 3 per cent of nickel has similar properties. This subject has been to a certain extent investigated by M. Boussingault, whose results did not fully sustain those of Faraday. He found that steel with from 5 to 10 or 15 per cent of nickel added would in some cases rust as freely under water as steel without nickel. He also noted that some meteorites rust more rapidly than others. Nickel does not in all cases prevent rusting. A notable exception was found with the alloy of 63 parts of steel with 37 of nickel corresponding to the composition of the supposed meteoric mass of Santa Catarina, in Brazil, which resists oxidation in a remarkable degree.

The relations of nickel to carbon have been studied experimentally by the same authority. It appears that nickel does not readily absorb carbon and acquire steel-like properties. But the extreme toughness of most meteoric iron is well-known. This fact, and the excellence of the iron made from the nickeliferous limonite of Michigan, are very suggestive and important to the producers and consumers of forging irons. Another example of association of nickel ore

and iron ore is found at Antwerp, New York, and the list of examples of such association could, no doubt, be greatly extended.

An interesting contribution to the chemistry of nickel has been made by Margaret S. Cheney and Ellen Swallow Richards, of the Massachusetts Institute of Technology, who describe a new and ready method for the estimation of nickel in pyrrhotites and mattes. In the course of a systematic series of tests it was found that phosphate of nickel is completely soluble, while phosphate of iron is almost insoluble in acetic acid in the presence of an excess of phosphate of soda. The process for the separation of the metals in analysis is based on this fact.

Messrs. Eustis and Howe, of Boston, have published a method of separating nickel and other metals by suspending iron bars in nickel-bearing slag. The nickel is described as rapidly accumulating on the iron, and finally running down and trickling from the ends of the bars.

Garnier, of Paris, points out the fact that pure nickel has great capacity for the absorption of oxygen. The pure metal, fused with access of air and poured, absorbs enough oxygen to make it brittle. If fused in a reducing atmosphere it is malleable, but the same metal carried to a red heat with access of air can be pulverized under the hammer. This can be corrected by the addition of metallic manganese, but as the corrective effects of this disappear with repeated fusions, M. Garnier prefers to use phosphorus, and finds that an addition of three thousandths leaves the nickel soft and very malleable. His method of introducing the phosphorus is to first make an alloy of nickel containing about six per cent of phosphorus. This is then added in the proper proportions.

The refining of nickel and cobalt was commenced in the United States, at Philadelphia, as early as the year 1846, by Prof. James C. Booth, of Philadelphia. Ores from the Lancaster Gap mine, and some from other sources, were worked there by Professor Booth and his associates. Later, as already mentioned, Mr. Joseph Wharton purchased the works and established the nickel industry at Camden, where it has since been carried forward, using chiefly the sulphureted ore of Lancaster Gap, previously described. This ore, which contains from 1½ to 2 per cent of nickel, is enriched at the mine by a preliminary smelting into a matte containing 10 per cent or more of the metal. For a long time the ordinary nickel of commerce was produced and was used chiefly at the United States Mint for the subsidiary small coins. Mr. Wharton, not being content with the production of impure nickel, early commenced experimenting to determine whether nickel could not be produced in a pure and malleable condition, susceptible of being worked in nearly the same manner as iron, and of being applied in the manufacture of various objects requiring strength of material and a substance that cannot be easily oxidized. One of his earliest experiments was to take the somewhat spongy mass got by reduction of the oxide of nickel, and, after heating it to full redness, to work it under a steam hammer into a bar.

In 1873 Mr. Wharton sent to the Vienna Exposition a sample of nickel in the form of axles and axle bearings, and at the exhibition in Philadelphia in 1876, he exhibited a remarkable series of objects made of wrought nickel, such as bars, rods, a cube, a horseshoe magnet and magnetic needles of forged nickel. These did not excite the interest to which they were entitled as a remarkable advance in the working of this little known metal. The exhibit did not cause much comment, and it was not specially described or reported upon, except by the judges who reported the exhibit to the Commission as worthy of an award, in the following terms: "A fine collection of nickel ores from Lancaster county, Pennsylvania, with nickel matte, metallic nickel in grains and cubes, and manufactured nickel, both cast and wrought; nickel magnets and magnetic needles, cast cobalt, electro-plating with nickel and cobalt, and salts and oxides of both these metals; the whole showing a remarkable degree of progress in their metallurgical treatment."

Some of the same objects formed of wrought nickel were sent over to Paris two years later, and were exhibited in the American section in 1878. There, as in Philadelphia, they did not at first excite any surprise or receive any special attention. Very few persons realized what the objects really were, and that they were very different from alloys of nickel. In fact, very few chemists had ever seen nickel. Pure nickel was a rarity, just as samples of iridium or thallium are to-day. It was not strange, therefore, that the expert chemists and metallurgists of Europe on the international jury showed some incredulity and surprise when whole ingots and forged bars of metal and numerous finished articles of pure wrought nickel, without alloy, were offered for their inspection. These articles, not differing greatly in their appearance from the higher grades of nickel alloys, or from electro-nickel objects, were at first passed by without comment. No previous exhibition had been so rich in exhibits of the use of nickel and in the products from them. The influx of the pure carbonated and oxidized ores from New Caledonia had greatly stimulated the nickel industry in Europe, and had improved the quality of the alloys of nickel. New companies had been formed to manufacture nickel-silver and to produce nickel from these superior ores, at a lower cost than had before been possible.

(CONTINUED NEXT WEEK.)

Cœur d'Alene Mining Laws.

Enacted June 7, 1883.

SECTION 1. All locations on lodes or veins of quartz to conform to the U. S. Laws of May 10, 1872, as near as practicable, viz., 1,500 feet long by 600 feet wide.

SEC. 2. Placer mining claimants shall be allowed twenty acres located so as the length of the claim shall not exceed eighty rods.

SEC. 3. Each location shall be represented by the locator or his authorized agent in locating and recording.

SEC. 4. No person shall be restricted to one claim. Miners may locate one claim on any stream or gulch where ground is vacant, but no person shall be allowed to locate more than one claim on the same stream or gulch.

This section shall not prohibit any from bolding claims acquired by purchase.

SEC. 5. Claimants shall have one year from the first of January succeeding the date of location, to work their first annual assessment, which will be one hundred dollars each year thereafter. Claims shall be represented by twenty dollars worth of work each month after the first of June, until the first of November after the first year's assessment. Furthermore, all claims shall be considered laid over from the first of November to the first of June each season. Assessment work may comprehend all necessary work, such as building roads or trails, building houses, or any improvements needed in opening or working the claim.

Miners shall be allowed five dollars per day on assessment labor.

SEC. 6. Claimants shall be required to record their claims on the district records, within fifteen days from the date of location.

SEC. 7. The oldest or first claimant shall have the first privilege of water, but shall not prohibit others from using the surplus. All claimants shall be required to return the water to the channel of the stream for the benefit of those below.

SEC. 8. Several miners may form a company for the purpose of opening and working mines, in placer claims, where such claims are contiguous, and the labor performed by said company shall represent their several claims, though the whole labor may be done on one claim.

SEC. 9. Difficulties arising between parties in this mining district, shall be settled by arbitration. Each disputant to be allowed an equal number of arbitrators, and in case a tie on decision, said arbitrators shall have the power to call an assistant.

SEC. 10. All claims located prior to the date of the adoption of these local laws, shall be respected as those made after such date.

SEC. 11. The records of the Cœur d'Alene Mining district shall be opened and kept at Eagle City, Idaho.

SEC. 12. On the written application of twelve or more miners, the Chairman shall cause three notices to be posted conspicuously, giving ten days' notice of a meeting, said notices to specify the object and business to be transacted at such meeting. To make any changes in the present laws between the first of November and the first of June the following year, shall be illegal.

SEC. 13. These laws to take effect from this date, and any laws or regulations previously enacted that conflict with these laws shall be considered repealed.

A CURIOUS FIND.—In the tunnel of the Daniel Webster mine, northeast of this city, beyond the Wells-Fargo mine, at a point over 300 feet beneath the surface, a flow of water of a strange character has been encountered. The water boils up through the floor of the tunnel, and in the light of the candles presents an almost blood-red appearance. It smells like creosote, and has a pungent, disagreeable taste. When bottled and brought out to the light of day, the water has a rich, burnt sienna color. After standing for a time, a grayish, impalpable powder is thrown down, but the color of the water remains the same. Two or three gallons of the water have been brought to town and distributed among such persons as take an interest in things of the kind. Some of the water has been sent to San Francisco for analysis, and assays will be made of the sediment deposited by it. A bottle of the water kept in the sun for several days shows no alteration in color, and presents a clear, bright appearance of some tincture.—*Virginia Enterprise*.

TAKES A WIDER RANGE.—To-day Hugh Lamb, for so many years foreman of the old bonanza mines, will assume the position and duties of foreman of all the north end mines—Ophir, Mexican, Union Consolidated and Sierra Nevada—filling the place of R. M. Ballard, who recently went East to take up his permanent residence. As Mr. Lamb still remains foreman of the California and Consolidated Virginia, this gives him quite an extensive beat. However, he is tough as a huckskin string, and will be equal to the requirements. As work is in progress at only a few points, travel will be the principal labor called for.—*Enterprise*.

RED INK is made by taking two ounces best Brazil wood, one-half ounce pulverized alum, one-half ounce crystals of bitartrate of potassa, and sixteen ounces of distilled water. Boil down to one-half and strain. Then dissolve in it one-half ounce gum arabic, and add one and one-half drachms cochineal, dissolve in one and one-half ounces alcohol of specific gravity .839.

MECHANICAL PROGRESS.

Wire Rope and its Management.

Two kinds of wire rope are manufactured. The most pliable variety contains 19 wires in the strand, and is generally used for hoisting and running rope. The ropes with 12 wires and 7 wires in the strand are stiffer, and are better adapted for standing rope, guys and rigging. Ropes are made up to three inches in diameter, both of iron and steel, upon special application.

For safe working load allow one-fifth to one-seventh of the ultimate strength, according to speed, so as to get good wear from the rope. When substituting wire rope for hemp rope, it is good economy to allow for the former the same weight per foot which experience has approved for the latter.

Wire rope is as pliable as new hemp rope of the same strength; the former will therefore run over the same sized sheaves and pulleys as the latter. But the greater the diameter of the sheaves, pulleys or drums, the longer wire rope will last. In the construction of machinery for wire rope it will be found good economy to make the drums and sheaves as large as possible.

Experience has demonstrated that the wear increases with the speed. It is, therefore, better to increase the load than the speed.

Wire rope is manufactured either with a wire or a hemp center. The latter is more pliable than the former, and will wear better where there is short bending.

Wire rope must not be coiled or uncoiled like hemp rope. When mounted on a reel, the latter should be mounted on a spindle or flat turn-table to pay off the rope. When forwarded in a small coil without reel, roll it over the ground like a wheel, and run off the rope in that way. All untwisting or kinking must be avoided.

To preserve wire rope, apply raw linseed oil with a piece of sheepskin, wool inside; or mix the oil with equal parts of Spanish brown or lamp black. To give the mixture body, add some sawdust.

In no case should galvanized rope be used for running rope. One day's use scrapes off the coating of zinc, and rusting proceeds with twice the rapidity.

The grooves of cast iron pulleys and sheaves should be filled with well seasoned blocks of hard wood set on end, to be renewed when worn out. This end wood will save wear and give increased adhesion. The smaller pulleys and rollers which support the ropes on inclined planes should be constructed on the same plan. When large sheaves run with very great velocity, the grooves should be lined with leather, set on end, or with India rubber. This is done in the case of all sheaves used in the transmission of power between distant points by means of ropes, which frequently run at the rate of 4,000 feet per minute.

Steel ropes are to a certain extent taking the place of iron ropes, where it is a special object to combine lightness with strength.

But in substituting a steel rope for an iron running rope, the object in view should be to gain an increased wear from the rope rather than to reduce the size. —*Industrial Gazette.*

How Bessemer Steel is Made.

We give the following concise description of the mode of making Bessemer steel from the query column of the *Manufacturer and Builder*:

A charge of pig iron—five or six tons—rich in silicon and low in phosphorus, is melted in a cupola furnace, and is allowed to flow into a heated vessel lined with a siliceous or basic lining. This is the converter, and the details of its construction are such that air may be blown up by a powerful blast through tuyers at the bottom, thus compelling these jets of air to pass through the molten metal. The converter is mounted on trunnions, so that it may be tilted over to receive the charge of molten metal; and when the metal is run in, the blast is turned on, after which the vessel is righted. The chemistry of the operation is about as follows: The heat of the charge is sufficiently great to produce chemical combination between the constituents of the iron and the oxygen of the air, which, when started, liberates heat enough to keep the charge at an intense heat. The oxygen of the entering air first combines with the silicon, after which the carbon begins to burn, and, according to the description of the late Mr. Holley, "the volume and brilliancy of the flame increase, and the surging mass grows hotter and boils over in splashes of fluid slag; the discharge from the mouth of the converter is a thick, white, roaring, dazzling blaze, and the massive vessel and its iron foundations tremble under the violent ebullition. Towards the close of the operation the flame becomes thinner, and when decarbonization is complete it suddenly contracts and loses illuminating power. The determination of this period is the critical point of the process.

"Ten seconds too much or too little blowing injures or spoils the product. At the proper instant, as determined best by the spectroscopic, or by colored glasses, but usually by the naked eye, the foreman turns down the vessel and shuts off the blast. The charge of melted 'spiegeleisen' is then run in, when another flaming reaction occurs. The vessel being still depressed, the steel runs into the ladle, pure,

white and shining, from under its coating of red-hot slag. A blanket of slag, most useful in preserving its temperature, follows it into the ladle. The metal is now led into the ingot molds. After the exterior of the steel has crystallized, the mold is removed, and the ingot is ready for reheating and rolling." The operation of conversion occupies about twenty minutes.

The burning out of the silicon and carbon in the operation is likewise attended with the oxidation of a portion of the iron, and to correct this, as well as to introduce the proper proportion of carbon, an iron rich in manganese, called "spiegeleisen," is added. This is introduced in a melted state after the blow, above described. If the steel is required to be low in carbon, less spiegeleisen is introduced than where a higher steel is wanted. The quantity of spiegeleisen added varies, therefore, from 5 to 10 per cent of the charge.

Delta Metal—An Important Discovery.

It has long been known that the introduction of iron into our alloys of copper and zinc materially alters the physical properties of the products for the better. Several attempts have been made to use iron in this connection, but hitherto without practical success. Experimentally the results have proved satisfactory, but when tried on a working scale the process has failed from a want of uniformity in the products. Among others who have directed their attention to the matter is Mr. Alexander Dick, of London, who, after careful experiment and research, has succeeded in introducing the iron into the alloy in such a way as to give good results on a practical scale. This success is obtained by previously alloying the iron in such a manner that it is combined in definite and known proportions with the zinc. When wrought iron is introduced into molten zinc the latter readily dissolves or absorbs the former. The exact point of saturation or the proportion dissolved or absorbed varies with the temperature at which the molten zinc is maintained during the process, and it is by carefully ascertaining and controlling this temperature that Mr. Dick has been able to succeed in obtaining a perfectly uniform product. The metal thus produced, and to which the name of Delta metal has been given, is stated to be as much superior to brass as phosphor-bronze is to gun metal, or as steel is to iron. It possesses great strength and toughness, and samples cast in sand give a breaking strain of twenty-two tons per square inch. Forged or rolled into bars it shows a tensile strength of more than thirty-three tons per square inch, and drawn into wire of 22 gauge it is found to stand sixty-two tons per square inch before breaking. It has an excellent color, is very easily worked, takes a high polish, and tarnishes less quickly than brass, and on the whole appears to be susceptible of a very wide application both for useful and ornamental purposes. —*London Times.*

Steel for Heavy Shafts.

An engineer at a meeting of the Society of Engineers at Aix-la-Chapelle gave some facts in regard to the qualities of mild steel for heavy forged work that tend to modify the growing confidence in that material as compared with iron. He said that a Bessemer steel shaft of a high speed engine belonging to a rolling mill broke suddenly while the engine was moving slowly. The shaft was replaced by one of iron. In an engine works on the Rhine a steel shaft of 15 3/4 inches diameter broke, and inside was found a hole large as a man's fist containing two steel balls that during the two years of the shaft's rotation had been worn quite smooth. Another engineer said that in casting steel ingots it is more frequent to have a porous casting in mild steel than in hard steel. If steel ingots have incomplete, hollow, or porous spots, these do not become welded together by further heating and working, but, after being rolled thin, they retain their porosity, as unwelded spots are retained in wrought iron. As these porous places are generally in the center of the ingot, the round bars, the piston rods, and axles made of it have also usually an internal weakness, which it is difficult to set right in the working, and which may cause breakages in the future. In the course of the discussion it was shown that steel that hardened on the surface or sudden cooling ought not to be deemed mild steel, and was treacherous in its character. No material capable of considerable hardening should be called iron, and, if narrowly examined, it will be seen that a great deal of the ingot iron specified as "incapable of considerable hardening" is, nevertheless, capable of very considerable hardening under certain circumstances, such as a sudden cooling of a heated shaft. This "inconsiderable hardening" is just sufficient to shrink the surface, produce tension, small cracks, and finally breakages.

BURNING SMOKE.—Aug. Hansen, a well-known practical engineer of long experience, says: "Attempting to burn smoke after it is once formed is useless, under a steam boiler. The temperature of the furnace must be increased, and a sufficient quantity of heated air admitted to prevent its formation. This, together with the plan of introducing small quantities of fuel at short intervals, and a well set boiler, is undoubtedly the best 'smoke preventer' of the present day.

SCIENTIFIC PROGRESS.

A Mistaken Philosophy of Growth.

Professor Lionel Beale, in a lecture before the Victoria Institute, London, thus alluded to mistakes in scientific data made by philosophers who rely upon assumptions: "Herbert Spencer, strange as it may seem, affirms that crystals grow, and that non-crystalline masses of various kinds grow. He declares that the accumulation of carbon on the wick of an unsnuffed candle is an example of growth. * * * There will be found some of the very remarkable inferences upon which his system of evolution in part rests, and which may be clearly proved to be erroneous. Indeed, not a few of the assertions he makes may be answered by a direct contradiction with advantage to the cause of truth. Non-living things do not grow, as he affirms, while all living things and every form of living material does grow, although he says, with respect to a living plant, that its increase is not growth. * * * The growth of the most minute particle of living matter is, as I have stated, a vital process, and is due to the operation of a force or power absolutely distinct from ordinary energy and from every form of force of non-living matter. Every kind of aggregation is absolutely distinct from growth, and does not involve the latter. Processes of aggregation may go on to all eternity without the occurrence of any change resembling or allied to that of growth. Growth, after all, is but one of several purely vital phenomena.

"It would be tedious were I to repeat the dictatorial utterances in argumentative form, which have been published far and wide for the purpose of leading people to believe that a living thing was like a watch or a steam-engine or a hydraulic apparatus. Moreover, some of the comparisons have been voluntarily abandoned by their authors in favor of others even more absurd. Such tricks as calling a watch a creature and a man a machine are hardly likely to mislead even the most ignorant after they have withdrawn themselves from the bewitching influence of the persuasive eloquence of the materialist prophet, and have commenced to calmly think over his extraordinary utterances, in order to extract any meaning that may be hidden by the frothy metaphors of modern physico-vital conjecture.

"This, the dullest, the narrowest, the most superficial of all creeds—materialism, which includes some mixture of atheism, and theism of various forms and hues—has been half accepted by hundreds of persons during the last few years. I believe all materialistic doctrines, vary as they may in detail, will be found to agree in accepting as a truth—if, indeed, they are not actually based on it—the monstrous assumption that the living and the non-living are one, and that every living thing is just as much a machine as a watch or a windmill or a hydraulic apparatus.

Professor Huxley has been continually propounding and putting forward conjectural utterances of the kind during the last twenty years, and it is surely now time that something more substantial should be brought forward in support of the dogmas than conjectural chains of causation. * * * Between purely vital and purely physical actions not the faintest analogy has been shown to exist. * * * Within a very few years the hypothesis of molecular machinery will probably be forgotten, and the operation of vital power, as distinct from any ordinary force of matter, will be generally admitted and taught. * * * Look at it how you may, you will not discover the smallest speck of firm ground of truth upon which to build any form of the materialistic doctrine.

Unconscious Bias in Walking.

Mr. G. H. Darwin, in *Nature*, states that some ten years ago he made a few experiments upon the subject of "Unconscious Bias in Walking." He began by walking himself, and getting various friends to walk, with eyes shut, in a grass field. All walked with amazing crookedness in paths which were not far removed from circles. Two of the circles described were not more than fifty yards in diameter, although the pedestrians thought they were going straight. All diverged to the right, excepting one, who was strongly left-handed. "I then got eight village school-boys, from ten to twelve years of age," continues Mr. Darwin, "and offered a shilling to the boy who should walk straightest blindfold. Before the contest, however, I dusted some sawdust on the ground, and after making each of the boys walk over it, measured their strides from right to left, and left to right. They were also made to note, and the foot on which they hopped was noted; they were then made to jump over a stick, and the foot from which they sprang was entered; lastly, they were instructed to throw a stone, and the hand with which they threw was noted. Each of these tests was applied twice over.

"I think they were all right-handed in throwing a stone, but I believe that two of them exhibited some mark of being partly left-handed. The six who are totally right-handed strode longer from left to right than from right to left, hopped on the left leg and rose in jumping from that leg. One boy pursued the opposite course and the last walked irregularly, but with no average difference between his strides. When I took them into

the field I made the boys successively take a good look at a stick at about forty yards distance, and then blindfolded them and started them to walk, guiding them straight for the first three or four paces. The result was that the left-legged boys all diverged to the right, the right-legged boys diverged to the left, and the one who would not reveal himself won the prize. The trial was repeated a second time with closely similar results, although the prize winner did not walk nearly so straight on a second trial.

"I also measured the strides of myself and of some of my friends, and found the same connection between divergence and comparative length of stride. My own step from left to right is about a quarter of an inch longer than from right to left, and I am strongly right-handed."

Mr. Darwin believes that nine out of ten strongly right-handed persons are left-legged, the reason being that every active effort with the right hand is almost necessarily accompanied by an effort with the left leg, and a right handed man is almost compelled to use his left leg more than the other.

The History of Thermometers.

At the meeting of the Royal Meteorological Society, held on March 19th, the president, Mr. R. H. Scott, F. R. S., read a paper entitled "Brief Notes on the History of Thermometers." The name of the actual inventor of the instrument is unknown. The earliest mention of it, as an instrument then fifty years old, was in a work by Dr. R. Flood, published in 1638. Bacon, who died in 1636, also mentions it. The earliest thermometers were really sympizcometers, as the end of the tube was open and plunged into water, which rose or fell in the tube as the air in the bulb was expanded or contracted. Such instruments were, of course, effected by pressure as well as temperature, as Pascal soon discovered. However, simultaneously with such instruments, thermometers with closed tubes had been made at Florence, and some of these old instruments were shown at the loan collection of scientific apparatus at South Kensington in 1876. They are in the collection of the Florentine Academy, and in general principle of construction they are identical with modern thermometers.

Passing on to the instrument as we now have it, Mr. Scott said that most of the improvements in construction in the earliest days of the instrument were due to Englishmen. Robert Hooke suggested the use of the freezing point, Halley the use of the boiling point and the employment of mercury instead of spirit, and Newton was the first to mention blood-heat. Fahrenheit was a German by birth, but was a protégé of James I., and died in England. Reaumur's thermometer in its final form owes its origin to De Luc; while the centigrade thermometer, almost universally attributed to Celsius, was really invented by Linnaeus. Celsius' instrument had its scale the reverse way, the boiling point being 0° and the freezing point 100°. Mr. Scott then gave a brief account of some of the principal forms of self-registering and self-recording thermometers.

COMBUSTION PRODUCTS OF VARIOUS ARTIFICIAL LIGHTS.—*Zeitschrift of the Electrical Exhibition in Vienna* furnishes the following data respecting the character and quantity of the combustion products yielded by various forms of artificial light, the values being reduced to 100 candles and one hour duration of light.

	Water vapor.	Carbonic acid.	Heat in Kilograms.	Cub. meters.	calories
Electric arc light	0.00	0.00	57		
Incandescent light	0.09	0.00	230		
Argand gas lamp	0.85	0.45	480		
Petroleum lamp	0.60	0.35	730		
Paraffin candle	0.99	1.22	920		
Tallow candle	1.05	1.45	970		

From these figures it will be perceived that the tallow candle, for a given amount of light vitiates the atmosphere to a greater degree, and gives out a greater amount of heat, than any of the others. The paraffin candle is next in order. Then follows the petroleum lamp; then the argand gas lamp. The electric lights both of the arc and incandescent type, show their great superiority in quality over their would-be rivals by the total absence of objectionable combustion products, and a very low heat emission.

LIQUEFIED CARBONIC ACID AS A MOTIVE POWER.—We learn from one of our German exchanges that the steam fire engines of Berlin are provided with pipes for the discharge of compressed carbonic acid into the steam cylinder. When the engine starts from the station the boiler is heated, and on arriving at the fire the carbonic acid is first employed as a motive power, then the gas and steam together, and finally, when the proper steam pressure has been obtained, the steam alone. By this method of utilizing the compressed gas, the fire engine is brought into service four or five minutes earlier than would be possible with steam alone. The amount of carbonic acid gas used each time is about 17½ pounds.

A VAST NUMBER OF SPECIES.—There are supposed to be about 1,000,000 species in the animal kingdom. Of beetles alone over 100,000 species are known, and the whole number of insects is set at 500,000. Of the higher animals there are 1,200 mammals, 7,500 birds, 2,000 reptiles and 10,000 fishes.



A. T. DEWEY.

W. B. EWER.

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Passing Events.

Probably the most prominent piece of news from the mines is that which announces the closing down of several Tombstone, Arizona, mines, on account of the miners' wages question. We refer more fully to the subject in another column.

From the same Territory comes the unwelcome news that some of the copper mines there must close down—one already having done so—until the price of copper is more satisfactory, as they can make no profits at present rates.

If we believe all the reports from the Cœur d'Alene region, a number of new districts or gulches have been found and rich developments made. The people up there seem to be in rather an excited state just now, however. It is to be hoped that half of the reports are true, since if they are, a remarkably rich mining country will be developed this summer.

THE PARADISE MINES.—J. P. Courter, who has had extensive experience in mines, returned yesterday from a visit to Paradise. He was very favorably impressed with the appearance of the mines, and it is probable that an Eastern company with which he is connected may remove a fifteen-stamp mill from Lewis to Paradise.

The managers of the National Mining and Industrial Exposition, say that owing to the apathy of the citizens of Denver, in the matter of popularizing said institution, there will be no exhibition held this year in Denver.

The number of bills introduced in the House of Representatives during the present session of Congress is 6,538, not one-sixth of which will become laws.

Copper.

In the last number of the PRESS was an article on the cost of mining copper. The subject is one of the greatest interest on this coast, where our mines, laboring under disadvantage of high rates of transportation, and distance from commercial centers, must compete with the enormously productive and rich mines of the Lake Superior region. The Arizona mines, rich as are their ores, and easy as most of it is to work, will have to economize greatly to make any profits at present price when transportation is paid. Indeed Governor Tittle of Arizona, expresses the opinion that unless there is a revival in the price of copper, the working of such mines in that territory as yield copper only and whose ores are of low grade, will be seriously interfered with. The Calumet & Hecla, of the Lake Superior region, largely control the market. As their product is absolutely pure and especially malleable, they usually receive about \$20 per ton, or one cent per pound, more than any other copper mines. As they are now selling their copper at thirteen cents per pound, other producers will only obtain about twelve cents per pound, and at that rate very little, if any, margin is left for the class of producers in Arizona, referred to.

There is an immense copper belt in Arizona, but an increase of railroad facilities are needed to develop it. In Northern Arizona the leading copper camp is in the Black Hills where the United Verde Copper Company are working an ore, the gold and silver in which enables them to continue operations regardless of what they get for their copper. They have just built a 47 mile road which has cost \$10,000. The teams haul in about 350 tons of coke a month and 35 tons of bullion out. The freighting costs about \$15 per ton. All the copper mines in the territory labor under the burden of having to pay higher freights to send their products to market, than is the case with the Eastern mines. The distances are great. Much of the Arizona ore is smelted with the greatest ease, and the water-jacket furnaces in universal use do their work in a most satisfactory manner. Still the very low price of copper is reducing profit to a very small margin indeed.

Since writing the above we find the following paragraph in the Tombstone (Arizona) *Epitaph*: M. H. Smith writes us from Johnson, that on April 30th, the superintendent of the Peahody mine notified the men that he had received orders from headquarters to close the mine and pay all the men off. The smelter will continue to run until the ore on the dump is exhausted, when they too will shut down. The reason assigned for this action is the rise in the price of coke and the fall in that of copper.

Industrial Notes.

The Risdon Iron Works are building an addition to their shop room in the shape of a new boiler shop. The building will be 275 feet long, reaching through the whole block. It will be 45 feet wide and two stories high.

Our local woolen mills—the Golden Gate and Pioneer—are working on goods for Eastern orders largely.

Work has begun upon the shops of the California and Nevada Railroad at Emery station, in Alameda county. A large force of men was set to work on April 28th.

The iron and steel works at Los Angeles are busy preparing their shops with new machinery. They will use one of the Ohmew engines, made in this city. The tools are all of the latest pattern.

The cigar makers are gradually getting rid of Chinese help and putting white men at work. Half the working force of one of the largest factories here is now white.

The new paper mill at Compton, Los Angeles county, is rapidly approaching completion.

The journeymen painters of this city and Oakland are on strike for higher wages. In this city there are some 80 or 90 shops, employing about a thousand journeymen painters, at wages rating from \$4 a day to choice men to \$2 50 a day to others, averaging about \$3 per day all around. The Master Painters' Association wants to pay 33 cents per hour. The Journeymen Painters' Association ask for \$3 50 per day and nine hours work instead of ten. Their demand not being acceded to, the strike was made, something like 500 men walking out of 16 or 18 shops.

Miners' Wages at Tombstone.

A very serious aspect of affairs exists at Tombstone, the principal mining district of Arizona. The men in some of the prominent mines were notified that wages would be reduced 25 per cent on May 1st. This would bring wages down to \$3 per day from \$4, the amount paid since the camp started. This the men have refused to accede to and several mines have shut down with more to follow. A miner's union has been formed, the men have paraded with brass bands and are determined to have \$4 per day. The superintendents say they must either work for \$3 per day or the mines will be kept shut down. The grade of ore in the mines has gradually fallen off until some of the mines have been losing money. The reason of the closing of the Grand Central mine is thus given by Superintendent Gage:

It closed simply because its owners determined that it was suicidal to run it at a loss. For the past four months the company has been steadily losing money. Mr. Gage, taking a volume containing the receipts and expenditures of the mine for the past year, showed the reporter that during the month of January the loss was about \$2,000. For February about a stand off. For March over \$7,000 with an approximated loss for April of \$25,000. A table of battery assays showed that the ore now coming from the mine and being shipped to the mills, averaged less than \$20 per ton.

This ore is on the one hundred and two hundred feet levels, in which we quit working long since for the reason that it was so low grade. The ore worked for the past two years has come from below the two hundred level. This being exhausted we went back above, thinking the grade might improve as the work was prosecuted, but you have seen the result.

With a mill at the mine, and the consequent saving, it might be made to pay at the present rate of wages. Not only this but some of the ore is very refractory. With present facilities we have not been able to save more than from 70 to 80 per cent. I have shipped several samples however to the Ontario mine and had it worked up to 94 per cent, which is you see, quite an item. The probabilities are that we will get the Ontario processes and begin again, but while we are getting new machinery, etc., you can hardly expect us to run the mine at a loss. It takes time to make changes such as are contemplated. The Contention mine will shut down soon.

Powder.

Such has been the competition among the powder manufacturers of this coast that for some time no profits have been made, and, in fact, some have been working at a dead loss. Some of the smaller companies first succumbed. Then a large company, the Tonite, had to stop manufacturing. The Safety-Nitro, on the strength of a big railroad contract, had quite a boom, but that is some time over, and the company has not made much of a stir of late. The Giant, Vulcan and California powders, and some others, have been sold for many months at such low prices that the manufacturers have made no profits.

It is thought now that before long the local powder companies will come to some sort of agreement, so that they can make a little profit on their goods. In which case, of course, miners must expect to pay a little more for their powder than they are now doing.

THE hoisting works of the Imperial quartz mine, situated on the north side of Deer Creek, two and a half miles north of Grass Valley, were destroyed by fire on Sunday night, the conflagration commencing at about 11 o'clock, and was caused by the explosion of 25 or 30 pounds of giant powder. At the time of the fire none of the employees were about the works, as no work was done about the mine on Sundays, further than to work the pump for a portion of the day. The supposition is that the powder was fired by some malicious person. The loss is \$2,000.

PEOPLE may now go faster from one distant point to another over the water than over the land. The New York *Sun* says: "If there were a straight stretch of water from New York to San Francisco, there is no train on the present schedule between the two points which the Oregon would not leave behind her."

SAMUEL C. STERENS one of the foremen of the Ontario mine Utah, was killed by falling from the cage in the shaft last Monday.

The Technical Society.

The first general meeting of the Technical Society of the Pacific Coast since the completion of the organization, was held on Friday of last week in the society's new rooms, 413 Sutter St., Col. Geo. H. Mendell in the chair. The resignation of Wm. Ham. Hall from the Board of Directors, on account of non-residence was received. Mr. George W. Dickie of the Union Iron Works was unanimously elected to the vacancy on the Board, thus giving the mechanical engineers proper representation in the governing body of the society.

Wm. Hammond Hall, State Engineer, read a paper "On the Sewage Question in California."

The writer considered the various classes of sewage and their disposition, and defined the word and the kinds of refuse implied in its use. The "sewage question" applies to the problem of final disposal of sewage matter and sewage. The term "sewage matter" applies to all refuse substances which are, or may become noxious in establishments under human control. The term "sewage" applies to waste matters, and liquids from such establishments with their burden of sewage matters. The term "final disposal" contemplates the disposition of sewage and matter in an unobjectionable way to its locality or public. The dry wastes of cities and towns was considered, such as yard scrapings, etc., and methods of disposition of garbage and rubbish described. The writer cited examples of the disposal of refuse in large cities, mentioning New Orleans, New York, Leeds and Glasgow.

Then came consideration of sewage matter proper—that is, the more noxious forms. The cesspool system was described and condemned emphatically. The dry systems were described and methods enumerated. Of the "water carriage" system Mr. Hall had much to say, taking up the branches of pollution of waters, of rivers, water-courses, etc. The question of land being the proper purifier of liquid sewage was discussed and also the action of the soil and air in effecting the disposal of sewage. Then came up the causes of opposition to irrigation, intermittent downward filtration, the reform movement, facts that were overlooked, value of sewage in England, the sludge complication, etc. Examples of sewage irrigation were cited and results described as experienced in London, Edinburgh, Paris, Dantzic, Berlin and various points in the United States. Filtration, precipitation and purification were considered under separate heads. Methods of sewage treatment were described in detail, such as the Coventry process, the native guano, or A. B. C. process, phosphatic process, lime process.

The conclusions drawn from experiences elsewhere were applied by Mr. Hall to the circumstances existing in California, where our climatic conditions are very different from most locations where the problems of sewage disposal have been or are being solved. Mr. Hall's local application of the conclusions were of great interest. The paper will soon be published by the society. A meeting will shortly be held when it will be discussed.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy was held on Monday evening, Professor Davidson in the chair. D. H. Behr read a paper on "The Germ Theory of Disease," which occasioned some discussion. Edward Probert was elected a resident member. Professor Davidson described his 20-day trip over the recently completed railways of Mexico. Having passed the arid Colorado desert, he reached El Paso, at an elevation of 4,000 feet above the sea, and encountered great tablelands, where the annual rainfall is three to four inches and cloud-bursts are frequent. The valleys are simple rock-gorges. The region is middle ground between the northern and southern systems of winds and weather. For 400 miles south of El Paso no signs of life appear. This aridity reaches to Chihuahua, where the rainy season is from May to September. At 7,600 feet mining is visible on every side and the utmost activity prevails; thence descending into a valley 6,000 feet high, wider than that of the Sacramento. Agriculture is carried on by the old methods of oxen drawing plows of crooked sticks, but wheat and corn grow abundantly. Plowmen receive \$5 a month to work from 5 A. M. to 7 P. M., less one hour nooning.

He described the trip to Pueblo and the city of Orizaba over the central plateau, and the descent of 8,500 feet, to the Atlantic towards Vera Cruz, where British engineers have constructed the railroad with a grade of 212 feet a mile, requiring a 75-ton engine to draw 16 cars at 8 miles an hour. Eighteen cents a day supports these people, who have been completely secluded from the world. All small land owners appear thrifty; but large estates are neglected.

The Manufacturers' Association.

The Directors of the Manufacturers' Association held their regular meeting at their office, 43 Merchants Exchange on Monday. President Hallidie was in the chair, and Directors Spaulding, Garratt, Phelps, Harazthy, Kerr, Hecht and Harney, and George C. Hickox, Secretary, were present. The Secretary reported that since the last meeting the association had sent a memorial to David Mc'hure, State Senator, urging him to use his influence in order to secure an amendment to the Constitution permitting the exemption of all tools and machinery used in manufacturing, and all raw material used for manufacturing. Also a communication requesting all School Trustees and Boards of Education in the State to examine into the merits of text-books that may be prepared and published on this coast, and all things being equal, to give them the preference.

The 3,000 copies of the association's circular, explaining its purpose and organization, had

Mining Machinery.

There is no economy in buying any kind of machinery because it is cheap. In the case of mining machinery cheap appliances may be the cause of great loss in more ways than one. Without counting the expense of repair and replacement, the delays incident to breakage are very expensive. In pumping gear thousands of dollars of damage may be done in a short time and much time be lost if it breaks. With the hoisting gear there is danger to human life and property. A mill that is a rattle-trap is a constant source of expense and dissatisfaction, and engines that require frequent overhauling and repairs are an annoyance and a source of expenditure. Cheap machinery of this kind never pays. In saving in the original cost there is often loss in the long run.

It is always well to select as good machinery of the class as possible. It is cheaper in the end. People who spend a week or two running around to get lowest bids and cramp the bidder

Prospects.

Holes in the ground, even if deep, are not mines. Too many people, however, are apt to think so. No one holds the opinion either more firmly than the very man who ought to know better—the prospector. He cherishes the belief that signs of a ledge and a moderate sized hole more or less deep, with a little dump alongside the windlass, is a mine. The prospector believed this so firmly to be a mine for so long a time that he convinced many others that he was right. Thousands of these holes have been bought before this, with the understanding that they were mines. And corresponding thousands have found out their mistake. To have a mine it is necessary to have a hole vertical, horizontal or inclined; but having a hole, it does not follow that one has a mine at the bottom or end of it. People have pretty well found this out. They do not go around bonding or buying these holes. To attract attention now and have any sort of a

On Rock Drills—No. 3.

[Written for the Press by Geo. J. Speight, C. E., 418 California St., San Francisco.]

This different character of the ground must be taken into consideration in comparing the results in the two headers. For detailed data about the work, the reader is referred to the annexed tables. The diagram given shows the actual progress made in each header compared with the assumed progress of 10.82 feet per 24 hours, serving as base of the contract. It also gives the average daily progress per 24 hours.

The progress of the heading made within a certain length of time is not well adapted to form a fair base for an impartial comparison between various systems of drilling machines, as it depends too much upon the nature of the rock, which is different in nearly every case.

Tables on next page go still more into the details of drilling, and cover the period from Sept.,

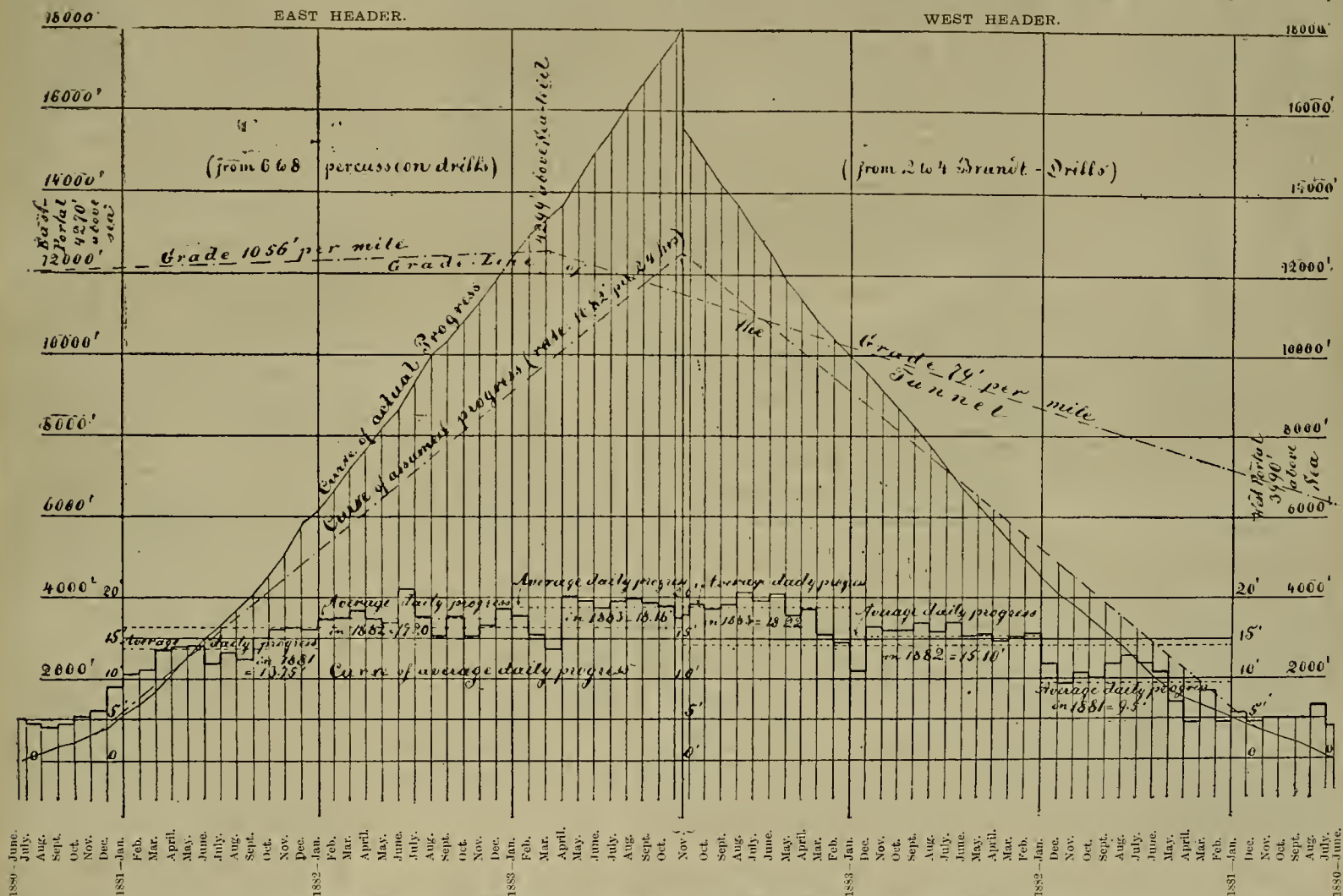


DIAGRAM SHOWING THE ACTUAL AND ESTIMATED PROGRESS IN THE ARLBERG TUNNEL.

been distributed among all the manufacturing firms of the State, and all persons interested directly or indirectly, with the manufacturing interests. The newspapers had also been sent copies, and many of them had given friendly notices of the association, commending its purpose as worthy of public approval.

The committee appointed to examine into the abuse of the license tax by druggists from other States had had several conferences with similar committees from another body, and stated that the authorities were exercising vigilance and enforcing the ordinances. A few convictions had been obtained, and if the ordinances at present in force are carried out, they thought they would remedy the evil.

The Association is actively at work carrying out the object for which it was organized, and is by no means a more passive society, but one which proposes to do as much for local manufacturers as possible. The officers are practical and energetic men.

The probabilities that a general strike of iron-workers in the West will be inaugurated June 1st are increasing. Oliver Bros. & Phelps' three mills at Pittsburg suspended operations, and it is said will not resume until the wages question is settled. This action is taken as an indication that the manufacturers are determined to make a reduction. The workmen show no signs of yielding.

down to the lowest notch never get satisfactory work. Good articles are worth a fair price. Every hundred dollars off the fair price lessens the value of the article in some way. Foundrymen do not run their works for glory. They want to make money as others do. They take a pride in their work generally, and like to do a good job for a customer. People, however, who run around looking for cheap things are not given the best things. They get what they are looking for. There is no better mining machinery made in the world than in San Francisco. The foundrymen whose names are in our advertising columns have been for many years in the business, and have the necessary experience to make machinery of any kind in first-class style. There is no excuse, therefore, for people to buy any "rattle-trap" mills or machinery that will be constantly breaking down.

GEORGE M. SMITH of Gold Hill has returned home from a six weeks' absence in Butte City, Montana. He says there are 8,000 or 9,000 people in Butte, about 2,000 men at work, 1,000 men who want work and can't find it, and another 1,000 who look for work, but do not wish to find it. The mines are looking well, and the country on the whole prosperous. Miners receive \$3.50 per day. It is said that owing to the fact that at Butte, Montana, they have found it expedient in some of the larger mines to send for Constock miners, against the latter class there has engendered a very strong prejudice.

market value, there must be a fair show of ore that will pay to ship or work, and pay a profit. Then the buyer will see about buying. Prospectors who recognize the signs of the times now give up trying to bold thirty or forty claims in a district, and concentrate their force on one. They dig and delve until they have something to show. When developments warrant, they can sell. It will be said this is hard on a man with no money. So it is, perhaps; but men without money in other branches of business have it hard too, until they build up something worth having. The hardship is imaginary, not real. Capital seeking profitable investment must take many chances anyway. It is not too much to ask the prospector to show that he has a mine before asking capital to develop it.

W. H. CLARK, who shot himself at Virginia last week was one among the first settlers of the Constock. In early days he was the foreman in the Chollar mine. Subsequently he went to Pioche, where he was superintendent of several mining properties. He has been engaged in the brokerage business in Virginia for ten years past. He has always been very careful in all business matters. When there has been any development on the lode he has always been found among the first to go underground and personally examine the "find." He was an excellent judge of ore, and of the value of quartz or other developments thought to be favorable.

1882, to Sept., 1883, during which the whole work was in its height of activity, and which can be considered the maximum capacity. The diagram shows graphically the progress actually made in comparison to the progress accepted as a base for the contract. The contractor was 13 months ahead of the time stipulated, for which he received a premium of \$324 for each day. It will be of interest to insert here the main points of the contract.

The main points of the contract of the Airlberg tunnel are as follows:

From the 1st day of February, 1881, the daily progress of the bottom header on the east side has to be at least 10.8 feet. The completed portion of the tunnel must at no time be more than 180 days behind the face of the bottom header, so that the entire tunnel, including the gravelling of the road bed, will be completed at the 180th day after the meeting of the two headers. (It was estimated that this would take place in the middle of the tunnel, and the tunnel would be opened for traffic about the middle of August, 1885.)

For each day the tunnel is finished after that date the contractor has to pay a penalty of \$324, while for every day the tunnel is finished sooner he will receive a premium of the same amount.

These penalties or premiums will be actually accounted for at each monthly settlement.

The progress in all the other sections of the work in the tunnel must also be at least 10.82 feet per day. The face of the top header must never be more than 328 feet behind that of the bottom header, and the total length of the un-

finished tunnel, simultaneously under construction, shall never be more than 1,965 feet.

The gravelled and finished road-bed of the first kilometer (0.62 miles) on either side must be turned over to the Government engineers 30 days before either half of the tunnel is completed. The remainder has to be so turned over that 40 days after the day of the acceptance of the first kilometer, the track can be finished in the whole tunnel.

If at any time any one of the sections of the work in the tunnel should be more than 1,000 feet behind the programme, the contract ceases

mechanical department, the contractor is responsible for its success. The contractor is obliged to have a previous understanding with the Government about the additions and alterations to be made to the installation. He has to make estimates and specifications thereof, to solicit bids from manufacturers, etc. The Imperial Department then makes from time to time an agreement with him, taking his estimates and specifications as a base. Such additional work has to be done by the contractor, paid for by the Government; after it is finished the Imperial Department inspects the same, accepts it and turns it over to the contractor for his use, free of charge, until the tunnel is finished. The finished sections of the tunnel are to be examined, and the accounts for them settled in the first week of January of each year.

The contractor guarantees his work for two years. The securities deposited by the contractor, \$243,000, will be returned gradually in installments, but only to such aggregate amount that never less than \$121,500 shall remain in the hands of the government. The entire installation—all the necessary machinery, buildings, pipe-lines, etc., etc.—whether they are procured with or without assistance from the contractor—remain the property of the government, and are only loaned to the contractor for use during the construction of the tunnel free of charge.

It was agreed that the first installations should be completed at the expense of the government until the additional amount so expended would have reached the sum of \$194,250 for the east header and \$202,500 for the west side. (When the contractor commenced work the aggregate amount expended by the government for the installations was \$255,000.) Any savings on the above amounts belong to the government, in addition to its rights as proprietor of the entire installation. The contractor has to provide, at his own expense, all the tools, tracks and switches, boarding houses, all draft animals and the necessary stables for the same, all arrangements for storing dynamite, etc.

The following prices were made the base for the contract:

The price of one running meter of tunnel in the first kilometer from each month is taken as the base; for each following kilometer a certain price is added to the one of the proceeding kilometer. The prices are:

1. Bottom header, first kilometer \$75 per meter (\$22 90 per foot.)

Additional price for each following kilometer, \$5 per meter (\$1 53 per foot.)

2. Top header, first kilometer, \$50 per meter (\$15 25 per foot.)

Additional price for each following kilometer, \$2 50 per meter (\$0 76 per foot.)

3. All the other work, as enlargement, masonry, arching, etc., but excluding masonry of sub-drain, is classified according to the kind and thickness of the masonry, etc., into ten different types, with different prices, of which the following are the most important ones:

Type No. 1.—No masonry or arching, but sufficiently large excavation to give room for a masonry lining 1.64 ft. thick, first kilometer, \$200 per running meter, (\$61.10 per ft.) Additional price for each following kilometer, \$10 per meter, (\$3.02 per ft.)

Type No. 2.—With arch and abutments in range rubble masonry, 1.64 ft. thick, no invert, first kilometer, \$295 per running meter, (\$90 per ft.) Additional price for each following kilometer, \$15 per running meter, (\$4.50 per ft.)

Type No. 6.—With arch 2.78 ft. thick and abutments 3.6 ft. thick and invert 2.13 ft. thick in range rubble masonry, first kilometer, \$545 per running meter, (\$166 per ft.) Additional price for each following kilometer, \$25 per running meter, (\$7.62 per ft.)

Type No. 10.—With arch 2.95 ft. thick, abutment 4.1 ft. thick and invert 2.62 ft. thick in cut stone masonry, first kilometer, \$815 per running meter, (\$248 50 per ft.) Additional price for each following kilometer, \$35 per running meter, (\$10.68 per ft.)

Prices for the sub drain, 2.62 ft. high in clear and with clear widths varying from 1.97 ft. to 2.62 ft., to 3.28 ft. are respectively \$2.44, \$3.03 and \$3.65 per one running ft. In the first kilometer, with additional prices of \$0.15 per running ft. in each following kilometer.

The estimates were as follows:

For the east half.....\$2,413,842
For the west half.....2,441,503
Messrs. Lapp & Ceconi were the successful bidders with 5 per cent addition to the estimate on the east half and 2 per cent to the west half, making the final cost as follows:

East half.....\$2,534,532
West half.....2,490,333
Total.....\$5,024,865

According to the final estimate the total cost

of the tunnel, including the graveling of the road-bed, will be \$6,777,750, or \$201 per running ft.; this depends largely, however, upon the amount and kind of masonry yet to be done.

Cost of installation up to Dec. 31, 1881, at which time the same can be considered as nearly completed:

East Side, St. Anton.	
1. Grading and roads.....	\$8,003 07
2. Water-power (wheels, pipes, flumes, etc.).....	57,904 13
3. Machines: 2 turbines, 4 compressors, temporary ventilation consisting of a locomotive and fans, the first installment of drills consisting of 14 drilling machines, 2 carriages, 400 drills, etc., 6 water-pressure engines, 6 compressors, 1 air reservoir, 4 water-pressure engines, 4 blowers, all the necessary pipes and accessories.....	161,499 49
4. Buildings.....	74,640 26
Total.....	\$302,046 95

West side, at Langen.	
1. Grading and roads.....	\$14,131 64
2. Water-power (wheels, pipes, flumes, etc.).....	85,306 62
3. Machines: 1 turbine, 4 pumps, 2 accumulators, temporary ventilation, first installment of drills consisting of 3 carriages, 3 hydraulic drills, with the necessary drills, rods and 300 drill bits and all accessories, 3 turbines, 8 pumps, 2 accumulators, steam engine of 30 horse-power as reserve, with 22 boilers, definite ventilation consisting of 1 turbine, 2 sets of ventilators, all the necessary pipes and accessories.....	120,996 12
4. Buildings.....	78,308 47
Total.....	\$298,833 05
Total for both sides together.....	\$500,880 00

The meeting of the two advance headers of the Arlberg tunnel is a most interesting and important event. The unprecedented rapid progress, which was 2.6 times as great as that in the Mont Cenis, and nearly double that in the St. Gothard tunnel, and the proper following of the enlargements and the arching, decide

TABLE NO. 3—GIVING DETAILS ABOUT DRILLING IN THE ARLBERG TUNNEL—WEST HEADING, HYDRAULIC DRILLS, 1883-1884.									
ITEMS OBSERVED.									
SEPTEMBER.	OCTOBER.	NOVEMBER.	DECEMBER.	JANUARY.	FEBRUARY.	MARCH.	APRIL.	MAY.	JUNE.
1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30
Total progress of heading (feet), including all interruptions (feet).....									
Average progress per 24 hours, including all interruptions (feet).....									
Average progress in the pipes before entering the drills (pounds per square inch).....									
Average time occupied by one attack (hours and minutes).....									
Percentage of total time occupied by drilling alone, in attack, exclusive of moving drill carriage.....									
Per one attack, average progress of heading (feet).....									
Per one attack, average aggregate depth of drill holes (feet).....									
Per one running foot of heading made, average number of drill bits used.....									
Per one running foot of heading made, average consumption of dynamite (pounds).....									
Average length of hole made by one drill bit, before requiring sharpening (feet).....									

Miscellaneous schist, with numerous streaks of quartz, immediately timbering necessary schist, 15 ft. thick, but not so favorable, requiring at times immediate timbering. Schist, rich in quartz, favorable, as in best half of January. Dark micaceous schist, with quartz, gradually changing to horizontal, light timbering. Vertical dip of layers gradually changing to horizontal, light timbering. Schist, rich in quartz, favorable, as in best half of January. Dark micaceous schist, with quartz, gradually changing to horizontal, light timbering. Vertical dip of layers gradually changing to horizontal, light timbering. Schist, rich in quartz, favorable, as in best half of January. Dark micaceous schist, with quartz, gradually changing to horizontal, light timbering. Vertical dip of layers gradually changing to horizontal, light timbering.

bottom header. It may be mentioned here, that M. Bridel, the Chief Engineer of the Gotthard Railroad, as well as his immediate predecessor, the now deceased W. Hellweg, pronounced both in favor of the bottom header.

The connecting drill-hole was bored on the third anniversary of the beginning of machine-drilling. Therefore, the progress made in three years was 32,242.4 feet; or per day, an average of 29.52 feet, which has never been done before, anywhere. The survey showed a deviation of the center line of .65 feet, which, however, was determined immediately after the connection, only by plumb-lines without any instruments. The level was absolutely correct, while the length was between 19 and 20 feet shorter than the one determined by triangulation. This is a rather interesting fact, as the same difference had been observed at the Mont Cenis and St. Gothard tunnels.

The following table shows the state of the different divisions of the tunnel on the day of connection:

TABLE SHOWING THE WORK DONE AND YET TO BE DONE ON NOVEMBER 14, 1883.				
	East Side.	West Side.	Together, 33,650.9 ft.	Header driven from east portal 2,414 ft. more than from west portal; therefore, point of connection 1,207 ft. west of middle of tunnel. Difference in total length, 23 ft. Together, 31,438 ft. Remains to be finished, 2,136 ft. Total length of top header, 33,595 ft.
Bottom header finished.....	18,032.5 ft.	15,618.4 ft.		
In per cent of whole length.....	53.6 per cent.	46.4 per cent.		
Of this were made by hand labor.....	693 ft.	741 ft.		
Top header finished.....	17,614 ft.	13,844 ft.		
Enlargements, length.....	15,724 ft.	12,057 ft.	27,788 ft.	5,783 ft.
Enlargements, excavations underground, masonry, length.....	421,820	425,000	846,820	180,500
Masonry, cu. yards.....	117,800	138,800	256,600	117,800
Tunnel completed.....	13,036 ft.	11,340 ft.	24,376 ft.	7,144 ft.
Luvert.....	2,387 ft.	8,100 ft.	10,487 ft.	about 3,940 ft.
Number of men employed.....	2,000	2,900		
Total of excavation.....			1,027,320 cubic yards.	
Total of masonry.....			374,400 cubic yards.	
Total of mass to be moved.....			1,401,720 cubic yards.	

Experience at Sonnstun Tunnel.

Experience with the Brandt drill at the Sonnstun tunnel in Austria. The Sonnstun tunnel is 4,690 feet long. The contract to finish the same called for a very short time, therefore two lateral drifts were run from the mountain side, so furnishing four additional working faces. It was commenced entirely by hand labor. But after 2,630 feet were finished, it became apparent that the tunnel could not be completed in time. The rock encountered was an exceedingly hard and close dolomite and limestone. The contractor, therefore, concluded to put on a Brandt hydraulic drill. This was in January, 1877; April 11, same year, the machine drilling commenced. The motor in this case was a steam engine 9x9 inches, with two boilers capable of furnishing 20 or 30 horse power.

The drill column had a weight, when filled with water, of 308 lbs. The diameter of its piston was 6 in. and of the piston-rod 5 1/2 in. The drilling-machine itself weighed 264 lbs. The diameter of the piston was 4 1/2 in. and that of the piston-rod 4 in. With a pressure of 1100 lbs. per square inch, the forward pressure forcing the drill against and into the rock, was equal to 13,400 lbs. The drill-bit had an exterior diameter of 3.15 in. and had five teeth, each 7-16 in. wide. The above pressure was distributed upon these five teeth, each of which exercised a total pressure of 2,680 lbs. or 393 lbs. for each one-sixteenth of an inch of its width.

The two hydraulic motors turning the drill, used about 530 gallons of water per one hour drilling. Only one drill was used in the face of the heading. On an average it made 1 1/2 in. drill-hole 3 1/2 in. wide per minute in hard, uniformly solid limestone. The face of the header had an area of 70 square feet and required only from three to five drill-holes, each about 4 ft. 3 in. deep. It took on an average three hours to drill these holes. The average progress of the drift per 24 hours was 6.7, and per one attack 1.87 ft. One running foot of heading required from 13 to 17 lbs. of dynamite. The average time required for one attack was 5 hours and 45 minutes, of which the drilling took 2 hours and 45 minutes. The wearing off of the drill-bit was slight. The 944 ft. of drift made by these machines at the Sonnstun tunnel required not more than 80 drill-bits altogether, none of them, after four months use, were so much ground off that they could not be used again. The repairs of the machines proper were practically none, as the driving of the 2,225 ft. of drift including enlargements did not require any other repair than the replacing of a few packings in the moving parts.

The making of a hole three and one-eighth inches in diameter and four feet three inches deep required on an average thirty minutes, i. e., from the beginning of the actual drilling to the completion, in which the drill bit had to be renewed from three to four times. The pressure can be so well regulated that the different hardness of the rock does not affect it at all, as it does in a percussion drill, where the sudden meeting of a soft seam only too often breaks the machine. For experimental purposes the drill was worked through cavities in the rock without the slightest damage to the machine or interruption of the operation.

The drill bits were never heated, as the water

TABLE NO. 4—GIVING DETAILS ABOUT DRILLING IN THE ARLBERG TUNNEL—EAST HEADING, PERCUSSION DRILLS, 1883-1884.									
ITEMS OBSERVED.									
SEPTEMBER.	OCTOBER.	NOVEMBER.	DECEMBER.	JANUARY.	FEBRUARY.	MARCH.	APRIL.	MAY.	JUNE.
1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30
Total progress of heading (feet), including all interruptions (feet).....									
Average progress per 24 hours, including all interruptions (feet).....									
Average progress in the pipes before entering the drills (pounds per square inch).....									
Average time occupied by one attack (hours and minutes).....									
Percentage of total time occupied by drilling alone, in attack, exclusive of moving drill carriage.....									
Per one attack, average progress of heading (feet).....									
Per one attack, average aggregate depth of drill holes (feet).....									
Per one running foot of heading made, average number of drill bits used.....									
Per one running foot of heading made, average consumption of dynamite (pounds).....									
Average length of hole made by one drill bit, before requiring sharpening (feet).....									

and the tunnel will at once be constructed at the expense and risk of the contractor, by the Imperial Department of Railways.

The contractor is responsible for the consequences of ordinary and extraordinary accidents. Only in case of war or epidemic he is entitled, under certain conditions, to extra compensations, the amount of which, considering only the actual additional expenses accrued to the contractor, is fixed alone by the Government.

Although the Imperial Department of Railways reserves for itself a leading influence upon the system of working the tunnel, and upon the

playing around them cools them and cleans the hole very effectively. From two to three men were needed to run one drill.

The total cost of the entire installation, including everything, was as follows,

1 Grading.....	\$872 00
2 Machine department, boilers, feed pumps, engines, pumps, accumulator, centrifugal pump, ventilator, lathe, and complete set of tools, also labor of setting up.....	5,625 00
3 Four hydraulic drills, complete with all accessories.....	4,800 00
4 Pipes.....	2,775 00
5 Freight, duty, salaries and miscellaneous.....	1,600 00
Total.....	\$15,672 00

The cost of one running foot of heading, including proportion of first cost (but allowing a sum of \$5,875 to be deducted from this first cost realized by the sale of the machinery) was as follows:

1 Proportion of first cost.....	\$10 39
2 Cost of machine drilling and ventilation.....	9 62
3 Other work in heading (blasting, removing debris, timbering, etc.).....	12 90
Total.....	\$32 91

or one cubic yard of excavation cost about \$12 70. This was the first railway tunnel in which the Brandt drill was practically tested—with the exception of a few experiments made previously in the Pfaffensprung tunnel of the Gnthard railroad.

Pfaffensprung Tunnel.

The cost of the entire installation for the Brandt drills and extra part was \$8,000.

Average time occupied by drilling to make one meter of heading.....	4 h. 12 m.
Average time occupied by blasting, removing dirt, etc.....	5 h. 24 m.
Number of drill holes for one meter of heading made.....	6 6
Total length of drill holes for one meter of heading made.....	21 6 ft.
Number of drills sharpened for one meter of heading made.....	26 4
Pounds of dynamite used for one meter of heading made.....	41 5

The cost of one meter of heading was as follows:

Proportional cost of installation.....	\$8 00
Running expenses and maintenance of installation.....	2 40
Wages.....	8 78
Dynamite, fuse and caps.....	12 50

Total cost of one meter of heading, including proportional cost of installation..... \$31 98

One drill hit made on an average .82 feet of drill holes, without requiring sharpening. Hardly any repairs were necessary, 2,127 feet of heading being run by two machines in 371 days (including all delays); average progress per day, 5.73 feet.

The average cost of one meter of heading made by the percussion drills was \$59 24, against \$31 98 when the tunnel was driven by the hydraulic drill.

Mines of Freiberg.

"Beihilfe Erbsteinen," in Freiberg Saxony, the percussion and Brandt drills were used, and the following results obtained:

	Percussion drills.	Brandt drills.
Mechan. labor employed 1,453,328 cu. lbs.	1,154,490 cu. lbs.	
Cross-section of heading.....	40 29 feet.	37 29 feet.
No. of holes for 1 attack.....	33 9	6 2
Total length of holes.....	84 06 feet.	22 00 feet.
Cost of 1 running foot of heading.....	\$8 01 9 13	\$7 72

In one minute $1\frac{1}{2}$ inches of a $2\frac{1}{2}$ inch drill-hole was drilled by the Brandt drill in hard gneiss.

Other Mines.

In the mine "Rheinpreussen" the progress made by one Brandt drill in a double-track crosscut was 312 feet per month.

In the mine "Notberg" the average daily progress was 8.5 feet made by one drill.

In "Bleiberg," when natural pressure was obtainable, the cost per one running foot of crosscut was \$4 23, while in "Freiberg," when steam-power was used to run the pumps, the cost was \$8 83. In another mine the lowest price of one foot was \$2 28, and the highest \$13 41.

The cost of running the crosscut from the Albert shaft in the "Plauesche Grund" in Saxony (face 80 square feet) through porphyry was \$8 83, against \$14 85 per running foot when run by hand labor.

The Brandt hydraulic rock drills are now used at a great many mines and tunnels all over Europe, and continue to give great satisfaction.

(CONTINUED NEXT WEEK.)

How to Run a Mill.

The following letter from Superintendent William Irwin has been received at the office of the Bode Consolidated Mining Company, in San Francisco. It shows that Mr. Irwin does not go much on the San Francisco style of doing things:

GEORGE W. SESSIONS, Secretary.—Dear Sir: I understand that there is considerable talk in your city about not getting the pulp assays weekly. If we were working a silver mine it would be all right to do so; but we are working a gold mine, where there is from ten to fifteen per cent of the whole stops in the battery, so that a pulp assay tells you nothing before the monthly clean-up. I am endeavoring to work your mine and keep the mills running at as little cost as possible, but the company (whoever they are) do not seem to appreciate this matter. Hereafter you shall have assays weekly, but you will please bear in mind that neither you nor I can tell from these assays what the ore is paying until the clean-up.

WM. IRWIN, Supt.

THE Northern Pacific has decided to stock and operate the Puget Sound Shore road, viz., the connecting link between the Columbia river and the Seattle road. It will probably be opened for traffic by May 10th.

USEFUL INFORMATION.

Making and Applying Kalsomine.

Kalsomine is composed of zinc white mixed in proper proportions with water and glue sizing. The surface to which it is to be applied should be clean and smooth. For ceilings the following receipt is recommended: Mix one-half pound of glue with 15 pounds of zinc; for walls, one pound of glue with 15 pounds of zinc. The glue, before used, should be soaked over night in water, and in the morning liquefied over the fire. Paris white is often made use of in preparing kalsomine, but it is not so satisfactory as zinc. The mixture may be colored to any desired tint by the addition of suitable pigments. The practical details of preparing and applying the mixture are given herewith from a very reliable source. In case the wall of a large room (say 16x20 feet square) is to be kalsomined with two coats, it will require about one fourth pound of light colored glue and five or six pounds of Paris white (observe our remark above on the use of this material.) Soak the glue over night in a suitable metallic vessel with about a quart of warm water. If the kalsomine is to be applied the next day, add a pint more of clean water to the glue and set the vessel containing it in a kettle of boiling water over the fire, and continue to stir the glue until it is well dissolved and quite thin. The object of treating the glue in this way is to avoid scorching it. Place the Paris white into a large water pail, pour on hot water and stir it until the mixture has the consistency of cream. Now mingle the glue liquid with the whitening, stirring it until thoroughly incorporated, and apply it to the wall with a white-wash or large paint brush. The object to be accomplished is to lay the liquid on smoothly, and a good whitewash brush with long and thick hair will answer very well. In case the liquid is so thick that it will not flow well from the brush, add a little hot water until it makes smooth work. When applying it the mixture should be frequently stirred, and the brush should be inserted into it only so deep as to take up what the hair will retain without dropping off. If too much glue is used the kalsomine cannot be laid on smoothly, and will be liable to crack. The object should be to apply a thin layer of sizing that cannot be brushed off with a broom or dry cloth. A thin coat will not crack. In this connection the following receipt for a whitewash used by the Lighthouse Board of the Treasury Department, and said to answer on board, brick and stone nearly as well as oil paint, than which it is much cheaper, may be found useful. Slake one-half bushel of un-slaked lime with boiling water, keeping it covered during the process. Strain it, and add a peck of salt dissolved in water, three pounds of ground rice boiled in water to a thin paste, one-half pound of Spanish whitening, and a pound of clear glue dissolved in warm water. Mix these ingredients well together and allow the mixture to stand for several days. Keep the wash thus prepared in a kettle or portable furnace, and when used put it on as hot as possible with a paint or whitewash brush. Coloring matters may be incorporated with these several mixtures, as may be required. Spanish brown stirred in will make a pink or red, more or less deep according to quantity. A delicate tinge of this gives a pretty effect for inside walls. Finely pulverized common clay, well mixed with Spanish brown, makes a red-stone color. Yellow ochre stirred in makes a yellow wash, but chrome goes further and gives a better color.

Painting is no Expense.

It must be admitted that the Germans, the world over, are celebrated for their industrious habits, thrift and general economy, and they have a maxim that "painting is no expense." This theory, regarded in a comprehensive view, is undoubtedly correct. An occasional coat of paint on the outside of buildings greatly prolongs their durability, and upon a metallic surface prevents corrosion. It is a matter of doubt, however, whether board fences, on account of being exposed on both sides to the wind, and rain and sun, remain in a sound condition longer by receiving an occasional coat of paint. We have seen them not protected by any substance, standing after an existence of fifty years; and in one instance, the hoard fence, behind which a company of riflemen sought protection when it suddenly fired upon the Hessians engaged in burying the dead after the close of the battle of Germantown, in the graveyard attached to the present Concord school house, on our Main street above Washington avenue, this fence, which was on the ground of the late Peter Keyser, maintained its position, though very thin, with the bullet holes worn to four times their original dimensions, seventy-two years after the battle, never having had, we learned, any paint upon it, as in fact, it was of rough cedar boards. How much longer it stood we are not informed.

Frame houses and barns are often painted dark colors, which are preferable to white in this latitude, as they have a tendency to absorb caloric and render the structures warmer than they would be if daubed with a light or white shade. The whitewashing of walls, fences and buildings produces a tone of neatness, but after a heavy rain or two the original faultless color is decidedly marred. Paint is more durable in its nature, and when applied to

either buildings or farming utensils well repays the expense, and when they are refreshed by an occasional retouching of paint, it is a very decided benefit in appearance and wear, and we commend, therefore, with confidence, the advantages of painting, agreeing with the Germans that "it is no expense."—*Ex.*

INVISIBLE PATCHES FOR FOOTWEAR.—An exchange gives the following as the material used by shoemakers for making what they call "invisible patches." It is a strong water-proof cement, and is prepared by taking gutta-percha, cutting the same into shavings, and dissolving them in chloroform, or in carbon disulphide. The solution should have the consistency of honey, and should be made in the cold, as the solvent rapidly evaporates when heated. When made, for the same reason, it should be kept in a well stoppered bottle. To use this cement, a patch of sufficient size should be made, the edges of the same, and of the place where it is to be, are scraped or shaved down thin, so as to make a smooth surface when the patch is put in place. A small quantity of the cement is spread over the fresh cut surfaces, which are then held near a flame for a few minutes to thoroughly warm the cement and cause it to penetrate the leather. The parts to be joined are then brought together and well hammered down, or clamped firmly in place. The cement dries rapidly by the volatilization of the solvent; and if the job has been properly done, the patch should be nearly invisible, and should make a thoroughly water-proof joint. This cement may be used equally well for patching rubber boots and shoes.

A NEW FEATURE IN PRINTING ART.—A discovery has been announced of a new process which, it is said, will permit of any number of copies to be taken of a book without setting a line of type. A compound has been discovered which may be spread upon a page without in the slightest way injuring the paper. It can be easily removed to a stone, and there becomes the matrix for a stereotype, or can be used for printing from at once. Old books can be reproduced in exact fac-simile, letter for letter, and broken stop for broken stop. The antiquarian will thirst for the blood of this too clever inventor; but practical printers are already moving to see whether they can not save the cost of resetting old editions, and if certain practical difficulties are got over we shall see a change not only in the production of fac-similes of old books, but in the reproduction of modern books. It will no longer be necessary to keep type standing. A proof will be as good as a stereotyped plate. It will be nearly as cheap to reproduce a volume as to print an extra copy of a volume passing through the printing machine.

GOOD HEALTH.

The Philosophy of Coughing.

The following remarks on the rationale of coughing, from the *Journal of Chemistry*, are appropriate and instructive: "Everybody coughs sometimes, and judging by the quantity of patent cough medicines sold, many people must be coughing all the time. Most persons suppose that a cough is a cough the world over, and that what will cure one will cure another; and so they prescribe for themselves and their friends all sorts of syrups, home-made or proprietary, with the consoling assertion that 'it can't do any hurt if it don't do any good.' How do you know it can't do any hurt? Do you know its ingredients, and, if so, have you studied their effects upon the system in health and in disease? Do you know the condition of the patient you are prescribing this for—his constitution, his habits of life, his past history?"

Let us see what a cough is. It is a sudden and forcible expulsion of the air from the lungs, preceded by a temporary closure of the wind pipe to give additional impulse to the current of air. The effect of these spasmodic expirations is the removal of whatever may have accumulated in the air-tubes, whether a foreign body from without, as when a particle of food finds its way into the windpipe, or an accumulation of mucus secreted in the air passages themselves.

Coughing is in part a voluntary act. We can cough whenever we wish to, but frequently we are compelled to cough when we don't wish to. Nerves are divided into two classes, sensory and motor nerves. The former carry intelligence to the brain; they report to headquarters any disturbance on the frontier. The motor nerves then carry back the commands of the general to act. You tickle a friend's ear with a straw, and his hand automatically proceeds to scratch the itching member. A tickling sensation is produced in the throat by any cause whatever; the brain then sends back orders to the muscles concerned to act so as to expel the intruder; in other words, to cough. And that is how we cough.

The source of the impression may be various. Frequently it is due to an irritation of the respiratory organs by foreign bodies, dust and acid vapors, admitted with the air in health, or to damp, cold air itself, if the organs are particularly sensitive, or to the presence of mucus, pus, or blood, in disease. Inflammation, from whatever cause, acts as a source of uneasiness.

There are, as we all know, many different

kinds of cough. Thus we have the dry cough, without expectoration, and the moist cough, with expectoration. We have the short, hacking cough, resulting from slight irritation, and the violent, spasmodic, and convulsive cough, caused by a greater degree of irritation, or some peculiar modification thereof. Then there are the occasional, the incessant, and the paroxysmal cough, terms that explain themselves. Hoarse, wheezing, barking and shrill coughs are due to the tension or capacity of the rim of the windpipe, or other portion of the tube. The hollow cough owes its peculiar sound to resonance in the enlarged tubes or the cavities in the lungs, if such exist. Sometimes the exciting cause of a cough lies not in the lungs and respiratory organs, but in the stomach, liver or intestines. In other cases there seems to be no real cause; it is purely nervous or hysterical.

ARE COAL TAR COLORS POISONOUS?—The trade in coal tar colors was at one time checked by reports that had been circulated respecting alleged poisonous effects produced upon the persons of wearers of garments dyed with these materials. Accordingly, at the aniline color works of Meister, Lucius & Brüning, at Höchst-on-the-Main, where 672 work-people are employed, particular notice has been taken for many years of the health of the employees, with a view to ascertain the extent of the alleged mischief. The products manufactured at the works are very numerous, including many finished dyes of various colors, in addition to nitro-benzol, aniline and alizarine. It is known that nitro-benzol is poisonous, yet among the twenty-four men employed at Höchst, in the nitro-benzol house, during the last four years, symptoms of "nitro-benzonism" appeared in only five cases. Aniline, also, is admittedly poisonous; and of twenty-nine men employed in the aniline house at Höchst, there were eighteen cases of specific aniline poisoning, none of which proved fatal. The workmen in the magenta house, says an exchange, were always reddened with the dye, even to the inside of the mouth, and some of the material must, therefore, have been swallowed; yet not a single case of specific ailment has occurred among them for eighteen years. Neither magenta nor its derivatives, when made without arsenic, can be considered in the slightest degree harmful. Naphthalene is observed to be deleterious only when in the form of hot vapors. On the whole, Dr. Grandhomme finds that the average mortality of the work-people was 4.2 per cent, which is a distinctly favorable result, and should go far to dispel any lingering dread of coal tar colors, on the ground of their supposed possession of poisonous qualities.—*Hatters' Gazette.*

THE CURE OF SACCARINE DIABETES.—In a paper by Dr. G. Felizet, read before the Academy of Sciences, August 14, says the *Journal d'Hygiène*, the author claims to have discovered a remedy for a disease usually regarded as incurable—saccharine diabetes. The author states that he has succeeded in putting an end to glycosuria artificially produced in animals, and that the medicine that suppresses that artificial glycosuria will likewise cure diabetes in a few weeks or months. There exists, says he, a bond of union between artificial glycosuria, intermittent diabetes and confirmed diabetes, and that bond is irritation of the rachidian bulb. It is not then, in masking the disease by submission to the severities of a regime exempt from bread, feculents, sugar, etc., that we succeed in curing it, but by tapping the very source of the production of sugar, that is to say, by suppressing the irritation of the bulb. Bromide of potassium, by the elective action of sedation that it exerts on the functions of the bulb, suppresses the effects of such irritation with a rapidity that is often surprising, and, in large and repeated doses, cures the diabetes.

SIMPLE CURE FOR COLD FEET.—The following remedy for cold feet is recommended by the *Fireman's Journal* for sedentary sufferers, as well as policemen, car-drivers, and others who are exposed to the cold: "All that is necessary is to stand erect and very gradually to lift one's self up upon the tips of the toes, so as to put all the tendons of the foot at full strain. This is not to hop or jump up and down, but simply to rise—the slower the better—upon tiptoe, and to remain standing on the point of the toes as long as possible, then gradually coming to the natural position. Repeat this several times, and, by the amount of work the tips of the toes are made to do in sustaining the body's weight, a sufficient and lively circulation is set up. A heavy pair of woolen stockings drawn over thin cotton ones is also a recommendation for keeping the feet warm."

THE SIZE OF DROPS.—This question derives considerable importance from the fact that many medicines are administered by dropping from a bottle. If it cannot be relied upon to give approximately correct results, it should be abandoned. Prof. C. F. Himes communicates to the *Journal of the Franklin Institute* a criticism of a statement upon this subject, which appears in the latest edition of the "United States Dispensatory." Among the conditions affecting the size of drops, the statement is made that "the drops from a full bottle should be less than from one more or less emptied." Prof. Himes affirms that this statement is erroneous, and that, on the contrary, other things being equal, drops diminish in size as the bottle is emptied, and to such a degree that any one can satisfy himself of the fact in a few minutes

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Calaveras.

STRIKE.—*Mountain Echo*: In the tunnel now being run by George Osborn & Co., in the Gold Hill mine near Smith's Flat, a strike was made last Wednesday which is likely to prove immensely rich. The end of the tunnel is about the center of the hill, about 80 ft. below the surface, and the vein is six inches in width. On last Wednesday they took out \$50, and on Thursday, about the same amount. The last pan that was extracted, yielded ten dollars.

El Dorado.

SLATE MOUNTAIN.—*Georgetown Gazette*, May 2: Mr. J. E. Jordan of the company of Jordan & Zombro of the Slate Mountain quartz mine, which they bonded some months ago to Mr. Monkton, made this office a call yesterday. The work of development on the lode has progressed rapidly, and the extent and richness of the ore is improving. The second payment has been made on the mine by Mr. Monkton. It was bonded for \$16,000, last December, and now the mine could not be bought for \$50,000. Over 200 ft. of drift on the ledge shows pay ore all the way which will average \$20 per ton. The ledge is from 18 inches to three feet wide. It is tapped by a tunnel about 100 ft. below surface. A winze is now being sunk on the ledge at this level to test it 100 ft. deeper. This work of development which will be completed by June, will determine the magnitude of the reduction works which will immediately follow.

Fresno.

COARSE GOLD GULCH.—*Fresno Examiner*: From John Krohn, of Coarse Gold gulch we obtain the following information relative to the mines in his section: The Hawkeye mine and mill on Deadwood is now being run night and day. The mill has five stamps. It was recently cleaned up and gave a heavy yield. The richest ore from the mine is sacked up and will be shipped to San Francisco for milling. The mine is looking fine. Messrs. Rule & McKenzie, owners of the Last Chance mine, started up their mill again on Thursday. They have a large amount of milling ore in their dump, and are continually taking out more. They recently discovered a rich chimney on the north end of their mine. Their old workings are looking as well as usual. Work was resumed on the Texas Flat mine on Monday, and the mill will be started up next week. It is stated that the French Company that have been negotiating with Col. Frees for Quartz Mountain are about to close the sale. Representatives of the Company are now in San Francisco, and Col. Frees has gone down to meet them. If the sale is consummated active work will be commenced at once. A ditch will be brought in from the North Fork of the San Joaquin, a distance of 25 miles, to supply the water for the mine.

Inyo.

CONFIDENCE MINES.—*Inyo Independent*, May 3: Mr. S. A. Densmore, the owner, has been to work on this group of mines for the last 16 years, off and on. They are located in Union district, opposite Independence, and about a quarter of a mile from the C. & C. railroad. In the bottom of the shaft, which is 106 ft. deep, the pay streak is 20 inches wide, carrying 30 ounces silver, 30 per cent lead and \$12 in gold, per ton, from which Mr. Densmore will ship five tons of ore next week to Selby & Co., San Francisco.

COTTONWOOD MILL.—We learn that the work is progressing satisfactorily. Mr. Chalfant said that he proposed to have the mill in running order in two or three weeks, and felt confident that there was plenty of ore out and in sight to keep the mill busy. Deep Spring Valley and vicinity are attracting considerable attention. The season has been so backward that prospecting as well as other industries have been greatly retarded, but as soon as the weather becomes settled we may expect cheering news from this section.

DEATH VALLEY.—The borate deposit interest increases daily. The Eagle Borax Works are working 11 men and keep three large teams steadily employed hauling the product of their mines to Mojave for shipment to San Francisco and New York. The Coleman Refinery employs about 40 men, and turns out three tons of refined borax per day, besides shipping a great quantity in a crude state. They keep nine 18-horse teams steadily on the road between the works and Mojave, a distance of 140 miles. The borax output of Death Valley is at the present time equal to supply the demand of the whole world. Mr. R. Neuschwander a most competent man, has charge of Mr. Coleman's interests in Death Valley. About the first of June work will be abundant at Furnace creek, Death Valley, owing to the intense heat during the summer months and the men moved to Amargosa to work on Mr. Coleman's mines at the latter place.

THE IREN MINE.—This mine situated in the southern end of Death Valley and about 25 miles from the San Bernardino county line, is owned by a Chicago Company. There is a shaft sunk on the ledge to a depth of 80 ft. in ore all the way down. The pay streak is 15 inches wide of ore that pays \$300 per ton. The ore is principally silver, with some copper and zinc. There are 80 tons now on the ore dumps which the Company's five-stamp mill is fast eating up. As soon as this lot is run through a roaster will be attached to the mill before another crushing is made. Eight men are employed in the mill.

WILD ROSE MINES.—Wild Rose district lies about 25 miles east of Lookout, in the southern end of the county. About seven years ago W. L. Hunter, of Lone Pine, located a series of mines in this district—the Argonaut, Junietta, Blue Belle, Blizzard and Virgin. He afterward sold interests in these mines to W. K. Miller and E. N. Medburg, of Lone Pine, and the three partners have since spent thousands of dollars and years of hard labor developing their property. The Junietta has a six-foot ledge which gives an average assay of \$50 per ton. There are 100 tons of assorted ore now on the dump that will yield \$100 per ton. The Argonaut joins the Junietta on the south, and has a ledge of equal size and richness. The Blue Belle is situated about six miles distant from the two former mines.

It has a well-defined 20-foot ledge, and it is claimed the ore will average \$80 per ton. There are now on the Blue Belle dump over 100 tons of this character of ore. The Blizzard and Virgin are close to the Blue Belle. The former claim has a four-foot ledge of fine horn silver ore. Over \$1,000 has been expended on the Blue Belle alone by the present owners. H. H. Welsh, lately returned from that section, informs us that he believes this series of mines are about the best he has seen in the county, and favorably located. There is plenty of wood and water close at hand, and the mines are easily reached by good roads from Panamint and Death valley. At present enough ore has been developed to keep a ten-stamp mill constantly at work for at least ten years.

A RICH MINE.—Within the past few weeks we have published accounts of the Carson mine, near Chrysopolis, furnished by parties interested in the property, and saying that the ore was above the average found in this vicinity. Outside and disinterested parties who have visited the mine lately, inform us that the Carson (formerly called the Eureka) is one of the richest mines in this county, and that the reports given this paper by the owner do not do it justice, by any means. They say the ore is "lousy" with free gold.

YGNACIO NO. 2.—There are two men working on the Ygnacio No. 2, Cerro Gordo, taking out ore. They already have ten tons of silver ore on the dump that assay 100 ounces.

LEONA MINE.—This mine, owned by B. Albert, is located on Yellow Grade, about four miles below Cerro Gordo. The owner has on the dump 53 130 pound sacks of ore, which he will ship next week. Mr. Albert informs us that the assays give an average of \$80 per ton. He also has about two tons of galena ore taken from his mine near the old Union mine, Cerro Gordo.

THE MAXIM COMPANY.—Supt. S. S. Barrie returned from San Francisco yesterday. The company purchased and now have on the way from the Pacific Iron Works all the necessary machinery for a five-stamp mill, which the Superintendent will commence to put up as soon as it arrives. It is expected in a day or two.

THE SAN LUCAS.—There are over 150 tons of good silver ore on the dumps of the San Lucas mine, Cerro Gordo. This mine is owned by R. Lucas, of Lone Pine.

THE ARIES.—M. A. Wheeler has five men employed in the Aries mine, Cerro Gordo, putting it in shape to take out ore.

PROSPECTING.—There are several prospectors in the hills surrounding Cerro Gordo.

Mono.

THE STANDARD SHUT DOWN.—*Bodie Free Press*, May 2: The miners, surface hands and mill-men employed by the Standard Con. Company were considerably taken a back yesterday on receiving their discharge, all in a bunch. At 12 o'clock noon the mill whistle sounded, and the clatter of the stamps ceased, and silence settled down upon the hoisting-works. The news created considerable excitement, for many persons would not have been more surprised to see the sun stop. Small knots of men stood about the streets theorizing as to the cause of the movement, and no two agreed. Some said that the bottom of the mine had fallen out; others that there was too much water to handle, and not a few who talked knowingly of "a nigger in the fence." The opposite side would come in and stoutly assert that the mine is as good as it ever was, and that it contains thousands of tons of good ore that has never been touched. There is a cause for this sudden shutting down of what has long been considered the representative mine of the district; but what that cause is remains to be made public, which will no doubt be done speedily. It is stated that water has lately been so troublesome as to make the extraction of ore difficult and expensive, and until the flow of water subsides the mine cannot be properly worked, as it is almost impossible to get out ore sufficient to keep the mill running. It is also stated that New York stockholders have been very much dissatisfied because of the recent break in the stock, and have resolved to have the mine examined and reported upon by experts of their own choosing, and until this is done it will remain idle. The New York mining papers have been talking in this strain for some time, but what it amounts to only the managers know. The Standard has been a grand mine, and, if it never yields another dollar, will always be counted as one of the best ever discovered on the continent. It has turned out about \$11,000,000 and paid over \$4,150,000 in dividends so regularly every month as to be termed the "Old Reliable." But it is "hid up in ordinary" now, and we can only hope that it may emerge from the present cloud and become as profitable as ever.

DEEP SPRING MINES.—Berry, Broder & Co. are now taking some remarkably rich gold rock from their mine, the Gold Coin, in Deep Spring Valley. Greenly & Co. are at work upon the wagon road to the "78" mine, preparatory to hauling the ore from that and adjacent mines to the mill, now soon to be in readiness for business. The Sam Piper mine, in the same locality, continues to horn out surprisingly rich in free gold.

BODIE CON.—*Free Press*, April 28: There was crushed at the Bodie Con. mill 114 tons of ore, and at the Bodie Tunnel mill, 302 tons. The average assay of the pulp was \$49.87, and of tailings, \$4.70. Most of the ore was taken from the Vulcan vein, which is looking well. To-day they will shut down the Bodie Con. mill for the purpose of putting in the new mortars, which will take about ten days.

MONO.—Since last report the east crosscut on the 260-foot level has been extended 9 ft; total height, 76 ft, with no change to report. The upraise on the Fortuna vein has gained 10 ft; total height, 32 ft. The vein continues about the same width, with ore of the same quality.

BODIE TUNNEL.—On the 200-foot level work is still being prosecuted by contract. They are working on the new vein recently cut, which shows up well—in fact, it is quite encouraging. The ledge is two ft wide.

GOODSHAW.—They are still drifting south on the 600-foot level, making 10 ft during the week. The formation in the face of the drift looks very favorable, and it is anticipated that something good will soon be encountered.

LUNDY NOTES.—*Honer Mining Index*, April 28:

Neptune No. 2, situated on the brow of the mountain west of and overlooking the Old Mono diggings, Jordan district, is now one of the finest prospects in this portion of Mono county. Josh. R. Crane, the well known Bodie blacksmith, who is the original discoverer and locator of Neptune No. 2, has extended the adit or drift 34 ft since January, and the whole length of the cut and tunnel shows from two to three and a half ft in width of clean ore, which ten assays recently made prove to be of good milling quality—in fact, much of the ore is very rich in free gold, while the whole mass carries a good average. Crane and his associates deserve success if any men ever did. Noonan and McCallum's Hyena vein, in the west wall of Lake canyon, nearly opposite the little mill, is showing steady and marked improvement as the tunnel progresses. The tunnel is now in about 154 ft and for the last 12 ft solid quartz of fine quality has been making in rapidly from the bottom of the adit, nearly the whole header now being in quartz giving good prospects in free gold. As this was the only claim in this district that was actively worked throughout the past winter, everybody interested in the district will be pleased at the success of the owners, as it will encourage others to go and do likewise hereafter. Arrangements are being made for the active working of the Bryant mine hereafter. The programme is to work through the shaft the coming summer, extracting and reducing ore as long as the season will permit of outdoor operations, and to drive a deep crosscut tunnel into the vein next winter. By this means could be opened, without expense to the owners, another long idle but valuable mine, for there is every evidence already in sight to establish the fact that the Bryant is fully equal to the May Lundy, both in quality and quantity of ore. The White Cloud a very promising claim, situated on the mountain above the May Lundy, and having a streak of decomposed quartz next the hanging wall that is extremely rich in free gold, is to be actively worked throughout the coming summer. It is owned by W. J. Walker and Wm. L. Callahan. The Great Sierra tunnel, Tioga district, is being driven ahead steadily, without change of formation worthy of note. The work is somewhat retarded by reason of insufficient power of the machinery for the present great length of tunnel, but this will be remedied in time. Two companies are being organized to work quartz in the immediate vicinity of the Old Mono diggings the coming summer—one in Bodie and the other in Virginia City. It is understood that the latter has a mill ready to put upon the ground whenever the prospect will justify such a move. The new five-stamp mill of the Gorilla M. and M. Co., to be erected on Wasson Meadows, at the foot of the company's tramway, has already been shipped from San Francisco, we understand, and the mine is being put in order for a lively run all summer. George W. Esh has resumed work on his Cora claim, just below or east of the May Lundy mine. He is sinking a shaft inclined to the dip of the vein, from which he intends to take several tons of ore for reduction in his arastra. Thomas H. Rule, foreman of the Virginia Creek Hydraulic Mining Company, arrived in Jordan district on Monday last, and will start work as soon as the snow gets off of the ground—early next week, probably. A great deal of prospecting and development work will be done the coming summer in the vicinity of the head of Bloody Canyon, both in Tioga and Prescott districts. There is now a probability that a strong Eastern company will take hold of the Silver Group property in this district some time during the coming summer. The indications are that the Jordan district will experience quite a boom the coming summer, with its gold, silver, copper and hydraulic mines in full blast. Several Bodie people who have mining interests in this district are waiting anxiously for the snow to get off so that they can get out here. It is expected that the Detroit Copper mine and smelting works, in Jordan district, will be started up in a week or ten days. It is said that the Mono Lake Hydraulic Mining Company will begin work at an early date.

Nevada.

DRIFT MINING AT CHALK BLUFF.—*Nevada Transcript*, April 26: A rich strike has been made at the South Yuba Company's cement drift mine at Chalk Bluff, Little York township, and the ten-stamp mill commenced crushing again this week. A rich lead of cement that prospects from 25 cents to a dollar a pan has been found and the management is happy. This lead is supposed to be the same one from which the Brown Brothers are said in times gone by to have taken something like a half a million of dollars, and which also yielded very large returns to various other parties who worked on it at different points. If the indication holds good, from 50 to 60 men will be working in this mine before long. At present there are just enough to keep the mill and hoisting works along from day to day. Jerry Goodwin is doing well with the Birdseye Creek Company's drift mine near by. They are from 30 to 40 men, said to be at work there. Good cemented gravel is coming out right along, and the ten-stamp mill is kept busy crushing it.

THE THURSTON MINE AND MILL.—*North San Juan Miner*, April 26: Last week we visited the location of the Cannon Ball quartz-cracker, recently constructed by Mr. Thurston near Cherokee. It is a wonderful invention. It was set in motion for our benefit and we watched it closely. It is capable of crushing 500 pounds of quartz per hour. That is its capacity and it does good work. The rock taken out of Mr. Thurston's mine looks as though it will pay for working. Free gold was visible in many pieces which we examined and we doubt not that the mill will grow richer at the depth of 100 ft than it is now.

Plumas.

HALLSTEAD LEDGE.—*Plumas National*, May 3: Mr. Jos. Hallstead was in town last Saturday, and tells us that everything looks favorably at the mine. Drifts are being pushed on the ledge, both east and west, and show well. In one drift the ledge is about 15 ft between the walls, and in the other the vein is steadily widening out and looks splendidly. Mr. Hallstead seems highly pleased with the prospects, and perfectly satisfied that the mine will prove as fine a quartz property as can be found in the State.

BUCKEYE STRUCK IT.—From Mr. Hersem of Onion Valley we learn that the workmen in the Buckeye claim, at Sawpit, struck fine pay gravel a few days ago. This is an important strike as it demonstrates that a back channel or bench exists there, and if it proves permanent will place a large value on many claims along the ridge. It has been the opinion of many good miners who were familiar

with that section that a back channel would some day be found, and this strike would indicate that they were right.

San Bernardino.

CONTINENTAL.—*Calico Print*, May 3: We learned from Fred Heber, the principal owner in the Continental claim, that several weeks ago he commenced to take out ore, some of which looks as though it would assay about \$500 a ton. Mr. Heber owns five-sixths of the claim and Abe Whistler, of Daggett, one-sixth. We were informed that pieces of rock from the croppings assayed from \$12 to \$26 per ton. The character of the ore is similar to that of the Bismarck and Humburg. The claim is situated about half a mile north of these mines and in the same belt. Mineral has been found in several places on the surface of the claim, although of a low grade, yet it is sufficient evidence that mineral exists in other points besides the place where sinking has been commenced.

ORIENTAL MILL.—The Oriental mill is constantly at work, principally on King ore, and frequently on custom ore. The mill continues to work beautifully and successfully. Col. E. P. Johnson has become thoroughly familiar with the various kinds of ore in Calico and other districts in this county and is able to treat them most successfully, working the same to a very high per cent.

HUMBURG.—One hundred tons of low grade ore from the Humburg mine have just been reduced at the Oriental mill. The ore was taken from the mine without any assorting excepting the removal of what was considered a very rich chunk of ore. It is reported that the return realized was \$40 a ton, which is a good figure considering the grade of the ore and the immense quantities of the ore that have been taken out and that still remain in the mine.

KEARSAGE.—The Kearsage mine continues to look well. The shaft has been sunk recently about 25 ft and is now down about 70 ft or 150 ft below the apex of the croppings. There appears to be a body of ore several hundred feet in dimensions that has burst upward through a strata of hard, red, barrell rock, and it is calculated that if the ore holds out 50 or 100 ft further down the mine can well be considered a rich and probably permanent one. Messrs. Stevens & McCullough seem to be pleased with present prospects. Work on the invincible mine is still progressing with results most pleasing to its owners. As a result of the work of thirty shifts, five tons of high grade ore were taken out.

Shasta.

ORO FINO.—*Cor. Yreka Union*: Messrs. M. D., Sylvester and John Eastlick have struck a quartz ledge one-half mile north of Oro Fino which they say will prospect \$100 to the ton. They are preparing to erect an arastra on Kidder creek to crush the ore. Messrs. Macaulay and Alford are preparing to crush the ore which they took from the Pinkham & Hull Gulch mine. They are going to use the Shackleford arastras, belonging to Mr. Diggles. Mr. Campbell & Co. are running their placer mine with a full head of water and three giants, and expert miners say that he gets off more ground in one week than our average miners do in a whole season. Having occasion to visit the Bonanza a few days ago I found the mill running on first-grade ore, and all hands busy and in fine spirits. They have been bothered somewhat during the spring months for want of power, sometimes using steam, and at other times water, and then both water and steam. At last they attached what they call the Bonanza windmill, which gives them ample power to run at a rate of 300 revolutions per minute and reduce the ore at a rapid rate.

Sierra.

SALE OF MINING PROPERTY.—*Mountain Messenger*, May 3: The one-half interest of the interest of the estate of B. T. Egglestone in the Egglestone & Mowry mine, Craycroft Hill, was sold by C. C. Smith, Administrator, this week, for \$5,170. The deed was drawn by Attorney F. R. Wehe, signed by C. C. Smith, when the coin was paid over by Lemuel Foss, and the sale was confirmed by the Court.

BALD MT. EXTENSION.—The Bald Mt. Extension Co. at Forest City, cleaned up 140 ounces Sunday. Water was tapped in the drifting works that caused an extensive cave keeping the entire force in the mine for three days on repairs. The main tunnel is over 700 ft in the lava flow. The yield for April was over \$12,500. The Sierra Buttes Co. are operating eight Frue concentrators in the Sierra City mill.

Trinity.

PROSPECTING.—*Trinity Journal*, May 3: Prospectors are beginning to stir about some, and it will not be long before the hills will be full of them, as good weather, for out-door work is now certain. The rich quartz mines discovered in this county during the past few years, and the stoppage of hydraulic mining in lower counties, will give a boom to prospecting in Trinity, which promises to result in many good discoveries. Experienced miners say it is to-day the best field for prospectors on the coast—particularly in quartz. The fact that the ledges already found pay from the croppings down make it an enticing field for men of small means.

NEVADA.

Washoe District.

BEST AND BELCHER.—The west crosscut on the 1200 level is out about 80 ft. The last 30 ft was in very hard rock, but softer rock is now coming in, and the ground has a favorable appearance. An east crosscut will soon be started on this level. On the 2700 level a drift is being run north from the Gould and Curry joint station. This is out 50 ft. It is in birdseye porphyry carrying streaks of quartz.

GOULD AND CURRY.—A drift is being run south-east from the Best and Belcher joint station on the 2700 level. This is out 25 ft. The diamond drill was put into the face and sent in about 40 ft. It tapped a considerable amount of hot water, and also penetrated a body of quartz. The water makes the drift intensely hot, and work has been discontinued to await its draining out.

ALTA.—The diamond drill is still running west from the face of the main west drift on the 2150 level. As soon as the drilling in that direction is completed the miners will resume work in the drift and the drill will be put into the main east drift on the same level, where there are signs of water.

MALE AND NORCROSS.—Work has been discontinued on the 2800 level pending the putting in of a bulkhead to stop the water flowing from the north drift in the Savage on the 2600 level and in the Chollar drift southwest on the same level. The miners have been laid off until these bulkheads are finished.

CHOLLAR.—On the 2600 level the main west drift was turned to the south, when water appearing in the face the diamond drill was put in. A strong flow of hot water was encountered when the drill holes were plugged. A stone bulkhead will now be put in across the drift.

SILVERA NEVADA.—On the 3100 level west crosscut No. 3 is out about 20 ft. It has not yet reached the ore vein. The diamond drill is still being run from the face of the west crosscut No. 1. It shows some water to the west. No work is doing in west crosscut No. 2.

MEXICO.—On the 3100 level the winze has been sunk and timbered about ten ft this week. Its total depth yesterday was about 40 ft. It is still passing down through a mixture of quartz, clay and porphyry.

SILVERA.—Work has not yet been resumed in this mine. The water tapped by the north drift on the 2600 level is slowly decreasing. A stone bulkhead is to be built across the drift.

UNION CO.—The only work doing on the 3100 is in west crosscut No. 2. It still continues in vein porphyry. The east crosscuts on this level are gradually draining out.

YELLOW JACKET.—The usual amount of ore is being taken out on the old upper levels. This is worked at the Carson river mills, which are kept going to their full capacity.

CALIFORNIA.—The east drift on the 2900 level, joint with Con. Virginia, is making about 30 ft per week. Repairs to the C. and C. joint shaft are continued.

ANDES.—Some paying ore continues to be extracted and the prospecting drifts encounter a good deal of quartz of a promising character.

COMBINATION SHAFT.—Are now sinking below the 2800 level. At a proper depth the Cornish pump will be moved down the distance of another lift.

UTAH.—The north drift on the 1950 level has been advanced about 30 ft. The face remains in material showing quartz and porphyry.

BELCHER.—The usual amount of ore is being extracted on the old upper levels, and the mills on the Carson river are kept steadily running.

CROWN POINT.—The usual amount of ore is being extracted, and the mills on the Carson river are kept running to their full capacity.

Belmont District.

BELMONT.—*Courier*, May 2: Have connected No. 3 stop with No. 4 and have the timbers all in place for 95 feet, making a continuous slope of fine ore all ready for taking out, 95 feet in length with 475 feet of backs, this being virgin ground to the surface. Will soon commence repairing the mill, which will require only a few days, as the mill was put in first-class order last season. It is therefore expected to make a speedy and successful run very soon.

Columbia District.

AN EXTENSIVE PURCHASE.—*True Fissure*, May 2: The large lot of base ore which has been piled up and lying on the dump at the Victor was sold the other day to B. G. Smith. It is estimated that there are from 3,000 to 3,500 tons in the lot. Some of it assays over \$500 per ton, though the larger portion is of a base character. The final disposition of the ore has not been determined upon, but it would make a month's run, and on full time, for any twenty-stamp mill in this part of the country.

Comet District.

BEING PUSHED.—*Pioche Record*, April 26: Work is being pushed ahead on the claims out in Comet district. The residents of the districts are commencing to imagine themselves millionaires.

Eureka District.

LOCAL NOTES.—*Eureka Sentinel*, May 3: There are ten tons of ore at the El Dorado mine, on Prospect mountain, awaiting shipment. Messrs. Ball and Poplin are taking out large quantities of flux ore, and shipping it to the Richmond furnaces. There are 100 tons of ore on the dump at the Silver Connor mine awaiting shipment to the furnaces. Fine weather having come with the last change of the moon, prospectors are again getting ready for their season's work. William Harrington is still driving ahead in the new tunnel at the Uncle Sam mine, on Peeltick hill. The breast is now in good ore-bearing ground. Martin Piantoni will put on a small additional force of men in the Dead-Broken mine, as soon as a trail can be sufficiently broken for the conveyance of necessary supplies to the mine. The main shaft of the Queen mine, at Silverado, has been sunk an additional 50 ft, and a new drift has been started from the bottom of it. The tributaries in the Queen are getting some very rich ore. Work on the Lemon mine, which was resumed last December, has been carried on continually since then. The Ivy boys and Harry Rickard have a lease of it, and are shipping ore to the Richmond furnaces. There are now 250 tons of ore at the Fair Play mine in transit to the Eureka furnaces. The property has yielded splendidly during the past year. It has been worked under a lease, which it is hardly probable will be renewed. Some of the tributaries at the Hamburg mine have been forced to suspend operations for the present, on account of the difficulty in getting grub and supplies to the mine, but fine weather having set in, this difficulty will soon be obviated. The tributaries at the Bald Eagle mine are again doing well. They are getting some very good ore, but are unable to ship at present on account of the snow blockade, which has been more severe this winter and spring than during any previous season. At the Alexandria mine water is coming into the main shaft a great deal faster than usual, owing, no doubt, to the melting snow and consequent seepage. The shaft is $6\frac{1}{2}$ x $9\frac{1}{2}$ in the clear, and the water rises daily from 18 to 20 ft from the bottom, which has to be lifted to the surface. There are three drifts now being driven from the main shaft, and other prospecting work is being done with a very fair outlook for striking new ore deposits.

Esmeralda District.

AURORA'S HOPES.—*Walker Lake Bulletin*, May 3: The people of Aurora are considerably elated

over the good prospects of the Silver Lining mine. There is many and old stand-by who has faith that the camp will breeze up again and be as lively as ever. It only needs a start. McKinley & Co. have certainly made a good showing during the time they have worked the Silver Lining, and perhaps others could do as well in other mines if they labored with the same industry and intelligence.

Pinto District.

ORE.—*Eureka Sentinel*, May 3: Andrew Berryman and his nephew, Richard Berryman, are taking some very rich ore out of the Silver Nugget mine, Maryland mountain. They have a good pitch and are making money. A party of miners are taking on out of the Farrow mine, which is situated on South Alhambra Hill. The property is beginning to show up splendidly, and will probably become one of the most prominent mines in Pinto district. The lessees of the Red Rose mine, Alhambra Hill, are taking out some fine ore. The mine is well located and is likely to prove valuable.

ARIZONA.

FROM MINING DISTRICTS.—*Prescott Courier*, May 3: Groom creek district miners are pleased with the outlook. Mr. Clarke is running his mill on ore from the 110 mine, which is yielding more gold than its best friends expected. The management will, we think, soon make an effort to work concentrates at home, as it does not pay to ship them owing to high cost of transportation, etc. Mr. Dan Hatz, who has invested considerable money in mines, has encouraging prospects in several districts. Mines belonging to John Holmes and Mulvennon & Roach, in Turkey creek districts are yielding very rich ores. "Old Grizzly" Callen and his Michigan friend are inspecting placer ground in Weaver district. Mr. Chase, Turkey creek district has several carpenters at work on his mill house. The Pine Spring and Dosoris, two of our richest silver mines, are in good condition.

BONANZA MINES.—*Quitoa Prospector*, April 26: Work on these mines is being prosecuted with the usual steadiness. The outlook continues to be most encouraging. Work has now progressed so far that interesting developments may be looked for at any moment.

PEERLESS.—Tunnel No. 1 is in 148 feet, with no material change in formation. Tunnel No. 2 is in 143 feet. Considerable quartz is coming in on the face of this tunnel.

PEER.—Tunnel No. 3 is in 123 feet, in very lively porphyry, and looks about the same as when our last report was made.

CROCKER.—Tunnel No. 1 is now 127 feet in length, in very favorable formation, deeply stained with iron, and with heavy seams. The rock is more stratified than formerly, and there is considerable heavy spar.

WINZE.—Is now down 72 feet, showing a slight improvement since last week.

COLORADO.

NOTES.—*Georgetown Courier*, April 26: A mill-run from the Vulcan last week returned 411 ounces silver per ton. The Georgetown tunnel will be driven 100 ft further before it cuts the Griffith lode. The Scotia mine is said to be looking well. A recent mill-run went 200 ounces silver per ton. The Pay Rock concentrating works, having been overhauled and repaired, will probably start up this week. Shay & Co. recently had their lease renewed on the Mendota, and will do more extensive work than ever before. The principal work being done on the Cliff at present, is stoping in the lower level. A fair quantity of ore of good grade is being taken out. The snow and ice on Democrat mountain is deeper than known for years. The mouths of the tunnels are blocked, and but little work can be done on a great many of the properties. A double shift is at work sinking on the main shaft of the Cory City. Twenty-five tons of concentrating ore per day will be delivered at the works as soon as they are ready to start. Shay & Co., lessees on the Mendota, shipped three cars of ore last Saturday, or about 30 tons, valued at nearly \$3,000. Myers & Beck shipped one car of 80 ounce ore on Monday. A new party of lessees are sinking from the surface on the Tishomingo. Saline and Co. are putting up a whim and expect to sink their shaft an additional 60 ft. They have a good streak of ore in sight. George Barrett, of the Barrett & Fletcher stamp mill, at Empire, brought over a beautiful gold retort this week, weighing three and a half ounces. It was the product of one cord of ore. The largest retort which he has brought to Georgetown yet was one which was produced last week. It weighed 16 ounces and 13 pennyweights. This retort was the result of one battery's work of five days on three and a half cords of ore. Mr. Barrett says there is but little ore being taken out around Empire now, on account of the heavy snow. The strike on the summit still holds out. We have seen specimens of ore four inches in width that assays 3,368 ounces silver per ton and 48 per cent lead. A lease has been let on the adit level of crosscut lode No. 1, in the breast of which two inches of good ore and 15 inches of quartz is shown. The lessees pay 25 per cent royalty on drifting and 35 per cent on stoping. A lease has also been let to sink a winze from the southwest drift of the 170 level to the 230 level. Drifting and stoping will be done through about 100 ft of ground. Assays made Monday on ore from the 230 level went 1,019 ounces silver per ton.

IDAHO.

EVANS' GULCH.—*Coeur d'Alene Pioneer*, April 28: The wildest excitement was created at Murrayville and Raven last Friday by the reported discovery near the Mountain House of rich pay dirt. The news had scarcely been whispered than 100 men gathered up their effects and proceeded in the direction named. Though the exact locality was not mentioned, the strike was finally found to be in Evans' gulch, a tributary of Prospect creek, only a mile from the Mountain House. As soon as possible pans were got to work and in a short time all were rewarded by a residue of coarse, clean gold, which greatly resembled that found in Bear gulch. The excitement knew no bounds when those present satisfied themselves of the wealth of the new diggings. Each man staked 20 acres, and the news spreading, hundreds more flocked in, until yesterday, when the entire gulch had been located. A town was immediately laid out around the Mountain House station,

and all preparations made to build. A couple of dozen tents are already up, and more will be put up as soon as they can be obtained. The diggings were discovered by William Evans last Tuesday. He had been prospecting for Mr. Truax of Thompson, and intended to come on to Eagle, when the thought of testing this gulch occurred to him. The first pan yielded him 20 cents, so he continued his explorations farther up the creek. That day the result of the repeated panning netted him \$15 in coarse, flaky gold. The discovery was reported to Truax, who came up, and both located claims on the best ground they could find. The news soon leaked out, and the keen instinct of the prospector resulted in the location of thirty claims by last Thursday. Yesterday over 100 claims were on record. Evans & Truax are down six feet, but have not at this writing struck bedrock. Others are getting their sluice boxes ready, and as there is plenty of water and a good fall, we may expect rich developments shortly. About 300 men are already on the ground, and a party just down from Raven reports that he passed nearly 100 men going to the scene of the strike.

SOUTH FORK BOOM.—In another column will be found an account of the Evolution district, organized last week. Since that time a genuine boom has struck this vicinity. Three weeks ago, Mr. Pritchard, who had been worried by constant applications for information about the location of some rich creek of which rumor had it he held the secret, finally gave some instruction to a few friends, telling where they could look for good ground. They finally came to the region described, which was none other than Canyon creek, or the north fork of the South Fork of the Coeur d'Alene river. Pay was found in many places, and all staked claims on the ground. Prospecting continued and the constant influx of others who had got on to the strike, soon filled the country with prospectors, and it was only a few days before Nine-mile creek, only $\frac{1}{2}$ mile west, was found to be equally as rich. Several discoveries were made last week on Nigger prairie—seven miles further west. Hundreds are going to the new diggings, and a town has already been laid out. It is located on a flat between the mouths of Canyon and Nine-mile creeks. Mr. C. B. King, the post-trader, has already sent in a stock of goods, and other supplies are on the way. The town was located by Messrs. Doud, Wallace & Co., who took up 160 acres. The Muller road runs through the new town, which is only seven miles west of Evolution. Mrs. Pritchard is the recorder for Evolution district, and will remove the office to the new town in a few days.

GALENA.—The recent strikes near the heads of Pritchard and Eagle creeks, show that the base metal is well represented. The beautiful specimens of galena which are brought in daily from new strikes, go to show that silver mining will likely be one of the important industries of the Coeur d'Alene country. The galena has a solid, blocky appearance, and resembles the Wood river variety. Though carrying a less percentage of lead, it is equally as rich in silver, and is much more desirable on account of considerable quantities of gold which assays show it to contain. The singular combination of lead, gold and silver, is something rarely met with; but we have it here, and in profitable quantities, too.

THE FINDS.—The variety of minerals which have already been found here is a significant indication of the "possibilities" which this country possesses as a mining region. Besides lead, gold and silver, the metals, manganese, copper, aluminium and zinc, exist in considerable quantities. The fact that considerable snow exists in the places most likely to contain pay-quartz, has restricted operations to the bottoms and low hillsides; nevertheless, the finds here are exceedingly gratifying, and is but a mild fore-runner of what will be found when the mountains are clear of snow.

COEUR D'ALENE NOTES.—Thirty ounces of gold were taken out of the Ives claim during the past two weeks. Mining property in this territory is subject to laborers' lien for the work performed on it. The gold in Pritchard creek is worth \$17 per ounce. In the side-gulches the average is a little higher. In Daisy gulch a great amount of work is being done. A shaft is down 65 ft and shows good colors at the bottom. The Butte Company have got their tailrace up and are ready to begin sluicing. One hundred and fifty dollars were taken out in a trial run. On the Widow claim the sluice-boxes are being set up at the rim of high water, and will be moved to get the channel as rapidly as the water will permit. The "New Comstock" is showing up well. A few men are at work, but the ledge is of such huge proportions that no certain result can be stated for several weeks. The placers on Beaver creek are sure to make a good showing during the coming summer. Eighteen ounces of fine gold were brought in from Beaver during the past week. About a mile and a quarter above Murrayville, on Pritchard creek, a boulder of quartz weighing 25 pounds was found that, for its size, rivals the famous Mother lode slab. It is estimated that \$150 is plainly visible. Two expeditions have gone from Eagle to new finds. The party which left here last Monday are reported on the North Fork of the St. Joseph. The other has got on to the Prospect creek racket and, of course, won't give it away. Bear gulch is a long, narrow gulch, 10 miles in length, and is located for nearly its entire distance. The gravel carries pay and several promising quartz veins have been discovered recently which has redoubled the activity in that section. Several fine specimens are on exhibition. The Mother lode is not the only property containing rich pieces of quartz. Several boulders streaked with gold have been found in various places, and small bits of rich quartz have been frequently met with. On J. C. Baker's claim, at Murrayville, a huge boulder of white quartz was found which is fairly sprinkled with gold. S. F. Mount and others, while prospecting one of the tributaries of the east fork of Eagle creek about six miles from town, discovered old gravel wash near the summit of the divide. The extent of the deposit is unknown, but it prospects well. Several men are at work in the vicinity sinking to bed-rock. Messrs. Porter and Henderson are busy on their various properties. The Gelat claim is being opened up as rapidly as men and money can, but it will be a week or more before all preparations are completed. Messrs. Porter and Henderson believe in getting a good ready and then going ahead. An additional force of six men were put on this week. The Golden Chest quartz vein, belonging to the same parties, located in Fancy gulch, is opening up a splendid variety of quartz, carrying free gold.

The hydraulic for the Webfoot claim in Dream gulch has been put in place. It is 150 ft of six-inch canvased hose, with a one and a half-inch nozzle. The fall already secured is 75 ft, and when the large reservoirs are completed, enough water can be obtained to carry on the work until late in the season. The booming creek now gives a good head of water, and the results will, no doubt, be in the proportion to the increase facilities.

MONTANA.

THE MILLS AND SMELTERS.—*Inter-Mountain*, May 1: The Lexington mills, which produced for the month ending yesterday, about \$95,000, are working on ore from the Lexington and Allie Brown. It pulps between \$50 and \$60 per ton. The old mill, however, is still working, partly on the old tailings dump. The Moulton, which has, until recently, worked considerable custom ore is now working on ore from the mine, and though it is not high grade, it is treated with such admirable economy and skill and there is so much of it available for extraction, that continued profits are assured. The Silver Bow mill is now treating ore from the Grey Rock and Poser, and is contributing between \$35,000 and \$40,000 monthly to the product of the camp. The Howell roaster is doing good work. The Alice mills are now running on a fair class of ore from the Alice and Magna charta, which, together, are producing about 90 tons daily. The best ore now coming out of the properties is that from the south vein of the Alice. The Parrot smelter, one of the best managed institutions in the country, is running exclusively on Parrot ore, of which a vast amount is now in sight in the mine. It is said that the Parrot Co. produces copper more cheaply than any other concern in Butte. The Dexter mill, wet crushing, is making a very successful run on Orphan Girl ore, of which it daily treats 28 tons averaging \$30. The Colorado smelter is working ore from the Gagnon and Nettie, principally, though the Shonbar, Clear Grit, Self Rising and other mines are regular contributors. Six furnaces are in operation, and still another is contemplated. The Belle smelter, which has been closed for repairs for the past few days, is running on a fair quality of copper ore from the Belle mine. Pending developments in that property are expected so to increase the ore output that the other stack in the smelter will be fired up, thus making a demand for at least 60 tons per day instead of 30 tons, as at present. The Montana smelter is working over 100 tons daily from the Colusa, which also produces several carloads of shipping ore. The 400-foot level of the mine shows up magnificent ore bodies, and its product could at any time be doubled.

NEW MEXICO.

MINING AT KINGSTON.—*Lake Valley Herald*: On Friday of last week we had the pleasure of visiting Kingston again and looking in upon some of its representative mines. We found the town looking decidedly dull, and heard many expressions of discouragement. The fact is that the town has always been too large for the amount of mining done—its only resource. The mines never showed better than now, and the smelter has been proven a success. At the time of our visit it was out of blast, but was to start again Saturday morning, after a three days' rest. Three car loads of bullion have been taken out of high grade, and large beds of ore are at hand ready for treatment, while the Iron King mine of itself is yielding nearly if not quite enough to keep up the blast. The Superior is said to be in a fine body of ore, while it and the Bullion are shipping their dumps, the former to Socorro and the latter to Denver; both are getting very satisfactory returns. The Lady Franklin is reported as having a good body of exceptionally high grade ore at 175 ft deep—some of it running to \$18,000 a ton. Work is again in progress on the Miner's Dream. Our visit was but a brief one, and we did not have time to visit either of the above, but we spent a forenoon at the Illinois and Greyhorse. We went first into the tunnel recently constructed; then went above into the shaft and drifts from which the bulk of the ore has been taken, and then examined several surface excavations where prospecting has been done. The shaft is down some 40 ft, at which point a cave in the limestone was opened into. While ascending the shaft one day Mr. Harris noticed a small vein or stringer of ore on the north side, and upon examination concluded to follow it. Within a few ft it opened into a large chamber of high grade carbonates. Other veins were followed through smaller chambers of similar ore until what appears to be the principal vein is struck, having a northwest and southeast course. This was followed with satisfactory results some 45 ft. Finding the indications of permanence satisfactory, Mr. Harris then concluded to open a working tunnel below; he went down the hill in the gulch to the extreme edge of the claim and drove it in through 60 ft of very solid and hard limestone. He struck the vein as anticipated, considerably below the upper workings, then upraised through it and put in an ore shoot, through which the ore is being taken out expeditiously and cheaply. Passing around the point of a ridge, we found Captain Thomas Burns at work on the Greyhorse. He commenced work with two men, gradually increasing to six. He has developed a strong lead of carbonates carrying 30 per cent lead and about 40 ounces of silver to the ton, of which he has taken out some 200 tons. The day before our arrival a peculiar vein of gravelly stuff of a reddish-gray color had been struck, and some four tons had been taken out. An assay of the lot showed an average value of 293 ounces. There is a well defined vein of this rich ore, and, naturally enough, the people of the camp were considerably excited about it. Taking altogether, the mining outlook was never more encouraging.

MINING MATTERS.—*Silver City Enterprise*, May 2: Smith and Tower, of Georgetown, made a shipment of Commercial ore last week. Development work has been commenced on the Hanover mine, Hanover district. Place, Johnson & Co.'s ten-stamp mill at Pinos Altos, will be running about the 20th of May. Elliott & Forbes have made a contract with the manager of the Kingston smelter, to furnish that company with 1,000 tons of ore from their Brush Heap and Andy Johnson mines at that place. Thirty-five tons of ore from the Emma and Hidden Treasure mines, in Chloride Flat, were shipped to Socorro for treatment.

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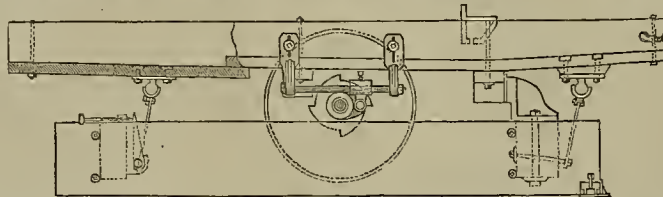
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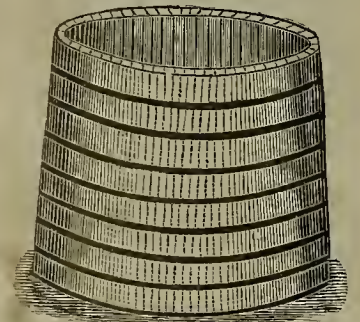
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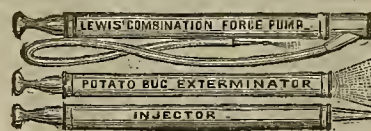
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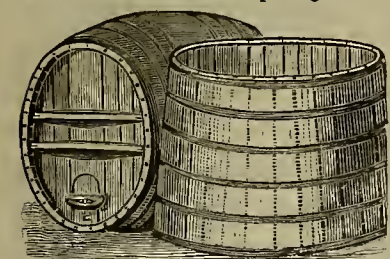
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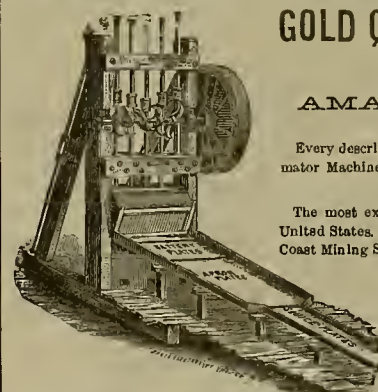
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.]

FOR WEEK ENDING APRIL 29, 1884.

- 297,657.—CULTIVATOR—Daniel Archer, Madison, Cal.
 297,910.—TRACK CLEARER—Ephraim B. Bishop, San Francisco, Cal.
 297,664.—MITER BOX—William L. Boyer, San Francisco, Cal.
 297,668.—TOBACCO SWEATER—George Brownstein, San Francisco, Cal.
 297,594.—STRAW CARRIER FOR THRASHING MACHINES—Maximilian J. Gessner, San Francisco, Cal.
 297,795.—CARTRIDGE IMPLEMENT—Henry T. Hazard, Los Angeles, Cal.
 297,698.—SAW SWAGE—Simon Kinney, San Francisco, Cal.
 297,699.—PIN FOR ELECTRIC INSULATORS—John M. Klein, San Francisco, Cal.
 297,714.—VEHICLE—Jacob Price, San Leandro, Cal.
 297,857.—FIRE ESCAPE—George Sinfield, Portland, Oregon.
 297,647.—SUBMARINE VESSEL—Josiah H. L. Tuck, San Francisco, Cal.
 297,648.—MARINE TORPEDO—Josiah H. L. Tuck, San Francisco, Cal.
 297,734.—WHIFFLETREE—James Whitcomb, San Jose, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

KEY-TAG.—Frank A. Knox, Woodland, Yolo Co., Cal. No. 297,270. Dated April 22, 1884. This invention relates to a new and useful key tag for use in hotels and lodging houses, or other public places, where the keys are constantly used by the general public. It consists in a double tag so combined and arranged that one side shall carry one advertising card, and when fitted together shall present said card on the observe and reverse side. The object is to provide a key tag suitable for containing cards or other printed matter for advertising purposes in hotels, etc.

PISTOL HANDLE.—Jno. C. Kelton, San Francisco. No. 296,412. Dated April 22, 1884. The object of this improvement is to promote a more perfect grip for the band, a means for extending the thumb along the handle in prolongation of the fire arm to produce a more rapid and correct alignment of the barrel on the object, and a recess to screen the little finger to steady the pistol and prevent the muzzle from dropping too low when the pistol is projected at the object to be fired at.

APPARATUS FOR MAKING RINGS, COUPLING LINKS ETC.—Silas Harris, San Francisco. No. 297,258. Dated April 22, 1884. This is an apparatus for the manufacture of metal rings, coupling or other links, and similar oval or circular articles; and it consists mainly of dies so grooved as to receive the link or other article in different positions, so that it may be first formed and partially united and then completely welded and finished at one heat.

FARM GATE.—Edwin D. Rathbun, Williams, Colusa Co., Cal. No. 295,674. Dated March 25, 1884. This invention relates to that class of gates which are opened and closed by the operation of levers on the side of the doorway, and it consists in the novel construction and arrangement of the devices for operating the gate and the latch, and in a peculiar guard to prevent the gate from being opened except by the proper means.

POULTRY FOUNTAIN.—John C. Tappeiner, Bisbee, Arizona. No. 294,932. Dated Mar. 11, 1884. The invention relates to certain improvements in poultry fountains of that class in which water contained in a reservoir is allowed to escape by degrees into a shallow pan. The top of the reservoir is provided with a removable cap and a perforated vessel is fixed or suspended within the reservoir. There are certain combinations of devices which go to make up the invention.

CIGAR BUNDLING MACHINE.—Henry F. Bebnser, Victoria, B. C. No. 297,220. Dated April 22, 1884. This is an apparatus by which cigars may be arranged into bundles and held so as to be tied and prepared for market; and it consists in a combination of devices for accomplishing the object readily.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

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COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL

ASSESSMENTS.

COMPANY.	LOCATION.	No. AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S. M. Co.	Nevada.	29.	50.	Mar. 27.	May 2.	W. H. Watson.	302 Montgomery st.
Andes S. M. Co.	Nevada.	24.	25.	Apr. 19.	May 19.	J. B. Burt.	309 Montgomery st.
Arizenta S. M. Co.	Nevada.	17.	10.	Apr. 16.	May 20.	J. M. L. McCoy.	322 Pine st.
Best & Belcher M. Co.	Nevada.	29.	50.	Apr. 15.	May 21.	W. Willis.	309 Montgomery st.
Con Imperial M. Co.	Nevada.	20.	05.	Apr. 30.	June 5.	W. L. McCoy.	309 Montgomery st.
Champion M. Co.	California.	12.	15.	May 7.	June 12.	J. B. Burt.	339 Montgomery st.
Excelsior Water Co.	Nevada.	11.	20.	Mar. 14.	Apr. 21.	C. P. Gordon.	309 Montgomery st.
Chollar M. Co.	Nevada.	13.	50.	Apr. 21.	May 23.	W. E. Dean.	309 Montgomery st.
Daisy Cement M. Co.	California.	1.	2.	Mar. 27.	May 1.	C. J. Collins.	312 Montgomery st.
Dayton M. Co.	Nevada.	12.	20.	May 2.	June 7.	D. C. Bates.	309 Montgomery st.
Excelsior M. Co.	Nevada.	20.	20.	May 3.	June 6.	C. E. Elliott.	309 Montgomery st.
Excelsior Water Co.	California.	6.	50.	Jan. 29.	May 14.	H. B. Whitt.	215 Sansome st.
Indian Spring Drift M. Co.	California.	2.	05.	May 3.	June 5.	A. B. Paul.	309 Montgomery st.
La Grange Ditch and M. Co.	California.	8.	50.	Mar. 31.	May 5.	M. C. Halsey.	328 Montgomery st.
Lady Washington M. Co.	Nevada.	4.	10.	Apr. 4.	May 9.	W. H. Watson.	302 Montgomery st.
Mexican G. M. Co.	Nevada.	26.	50.	Apr. 16.	May 20.	C. E. Elliott.	309 Montgomery st.
Murphy M. Co.	California.	8.	15.	Mar. 31.	May 8.	W. Letts Oliver.	328 Montgomery st.
Ophir M. Co.	Nevada.	4.	1.00.	Apr. 3.	May 6.	F. B. Holmes.	309 Montgomery st.
Puget Sound Iron Co.	Washington.	7.	1.00.	Mar. 12.	Apr. 25.	M. A. Halsey.	328 Montgomery st.
Peoples M. Co.	Arizona.	1.	25.	Apr. 8.	May 17.	J. H. Wells.	309 Montgomery st.
Rainbow G. M. Co.	California.	10.	10.	Apr. 15.	May 16.	J. S. Jordan.	311 Montgomery st.
Savage M. Co.	Nevada.	5.	50.	Apr. 5.	May 8.	E. B. Holmes.	309 Montgomery st.
Tilden M. Co.	Nevada.	3.	05.	Apr. 15.	May 19.	J. C. V. Hubbard.	310 Pine st.
Utah S. M. Co.	Nevada.	48.	1.00.	Mar. 21.	Apr. 28.	W. G. Pratt.	309 Montgomery st.

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M. Co.	California.	D. C. Bates.	309 Montgomery st.	25.	May 15
Bodie Con. M. Co.	California.	G. W. Sessions.	309 Montgomery st.	50.	May 5
Derbec Blue Gravel M. Co.	California.	T. Wetzel.	522 Montgomery st.	10.	Mar 15
Idaho M. Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Apr 2
Jackson M. Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar 16
Chollar M. Co.	Nevada.	J. W. Letts.	328 Montgomery st.	10.	Apr 15
Paradise Valley M. Co.	Nevada.	W. Letts Oliver.	328 Montgomery st.	10.	Apr 28
Standard Con. M. Co.	California.	Wm. Willis.	309 Montgomery st.	25.	Mar 12
Syndicate M. Co.	California.	J. Stadfeldt.	419 California st.	10.	Apr 5

San Francisco Metal Market.

(WHOLESALE.) THURSDAY, May 8, 1884.

ANTIMONY—Per pound.	14 @ 15
BORAX—Per Pound (extra).	16 @
IRON—Glenbrook, ton.	25 @
Edgilton, ton.	24 @
American Soft, ton.	23 @
Oregon Pig, ton.	— @
Clippage Bar, Nos. 1 to 4.	32 @ 35 00
Refined Bar.	34 @
Horsebores, keg.	5 @ 60
Nail Rod.	7 @
Norway, according to thickness.	6 @ 7
STEEL—English Cast, lb.	15 @ 16
Black Diamond, ordinary sizes.	14 @
Drill.	15 @
Machinery.	12 @ 14
COPPER—Ingot.	22 @
Braziers' sizes.	25 @ 27
Fire-box sheets.	50 @
Salt.	4 @
Old.	8 @
Bar.	— @
Cement, 100 fine.	12 @
LEAD—Pig.	7 @
Pipe.	7 @
Sheet.	8 @
Shot, discount 10% on 500 bags: Drop, 8 bag.	2 @ 10
Buck, 8 bag.	2 @ 10
Chilled.	2 @ 10
TIN PLATES—Charcoal.	7 @ 7 25
Coke.	6 @ 6 75
Terne.	6 @ 6 50
L. C. Charcoal Roofing, Hx20.	19 @
Salt.	9 @ 10
Sheet, 7x3 ft. 7 to 10 lb. less the cask.	9 @ 10
NAILS—Assorted sizes.	3 @ 25
QUICKSILVER—By the flask.	29 @
Flasks, new.	1 @ 50
Flasks, old.	55 @

Mining Share Market.

The Bodie stocks have been picking up again, though the Comstock shares have not been so lively. The Bodie Con. Co. is said now to have an actual balance on hand, above all indebtedness, of about \$126,000, inclusive of the shipment. This is equal to three monthly dividends of 50 cents per share each on the 77,000 shares of marketable stock, but whether the future dividend shipments will be large enough to enable the payment of these dividends from the reserves in the treasury, is another question. The expenses range between \$25,000 and \$30,000 a month.

The following are the financial balances of the various mining companies on May 1st: Cash on hand—Alta, \$24,658 36; Andes, \$188; Alpha Con., \$6,826 83; Bulwer, \$4,267 20; Bodie Con., \$144,019 88; Best & Belcher, \$2,207 80; Benton Con., \$15,183 19; Con. Virginia, \$56,716 13; Excelsior, \$2,668 42; Gould & Curry, \$22,445 67; Hale & Norcross, \$11,047 10; Mono, \$11,991 73; Martin White, \$5,876 10; Occidental, \$4,010 54; Potosi, \$4,758 01; Sierra Nevada, \$33,176 16; Savage, \$4,793 81; Utah, \$9,212 52. Indebtedness—Chollar, \$840 77; California, \$6,527 81; Lady Washington Con., \$4,093 74; Mexican, \$16,273 71; Ophir, \$19,367 88; Standard, \$11,403 46.

Bullion Shipments.

Hanauer, April 27, \$1,850; Ontario, 27, \$4,916; Horn Silver, 27, \$6,000; Vienna, 27, \$7,650; Hanauer, 29, \$5,750; Horn Silver, 29, \$9,000; Ontario, 29, \$9,797; Hanauer, May 1, \$4,050; Horn Silver, 1, \$6,000; Ontario, 1, \$4,316; Horn Silver, 2, \$6,000; Hanauer, 3, \$3,900; Horn Silver, 3, \$6,000. The banks of Salt Lake City report the receipts for the week ending April 30, inclusive, of \$100,153.13 in bullion; no ore. The receipts for the four months of the year amount to \$1,707,011.25; Bonanza King, 7, \$6,265; Bodie, 7, \$29,866; Contention, 2, \$13,663; Navajo, 5, \$8,000; Standard, 3, \$2,804.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. J. BARTLETT—Sacramento county.
 A. S. DENNIS—San Mateo county.
 A. C. KNOX—Napa, Lake and Mendocino counties.
 Wm. R. McQUIDDY—Tulare county.
 C. D. McDUFFY—Sacramento county.
 JOHN H. STURCKE—Santa Clara county.
 B. W. CROWLEY—San Joaquin and Merced counties.
 J. W. RILEY—Fresno and Tulare counties.
 G. M. McDOWELL—Calaveras and Amador counties.
 Wm. PASCOE.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 17.	WEEK ENDING APR. 24.	WEEK ENDING MAY 1.	WEEK ENDING MAY 8.
Alta.	1.25	1.35	1.10	1.55
Alta.	1.10	1.35	1.10	1.55
Andes.	20.	25.	10.	20.
Argenta.	1.05	1.10	1.10	.95
Belcher.	1.05	1.10	1.10	.95
Bodie.	2.20	2.35	2.00	1.90
Best & Belcher.	2.20	2.35	2.00	1.90
Bullion.	45.	35.	65.	50.
Bonanza King.	15.	25.	40.	30.
Bodie.	3.75	4.50	3.80	4.20
Bodie Con.	25.	35.	30.	40.
Benton.	25.	35.	30.	40.
Bodie Tunnel.	65.	90.	65.	80.
Bulwer.	.05	.20.	.15.	.25.
California.	.05.	.20.	.15.	.25.
Challenge.	1.00	1.40	.80	1.20
Chollar.	1.20.	1.00.	1.00.	1.20
Confidence.	.05.	.25.	.20.	.30.
Con. Virginia.	.05.	.25.	.20.	.30.
Con. Pacific.	1.25	1.40	1.10	1.35
Crown Point.	2.00.	2.00.	2.00.	2.25
Day.	4.15.	4.25.	4.00.	4.00.
Excelsior.	30.	20.	30.	15.
Grand Prize.	25.	30.	25.	30.
Gould & Curry.	1.35	1.55	1.40	1.50
Grubstake.	1.10	1.75	1.00.	1.50
Hale & Norcross.	1.10	1.75	1.00.	1.50
Holmes.	2.90	3.00	2.75	3.00
Independence.	.05.	.20.	.15.	.25.
Julia.	20.	30.	25.	30.
Justice.	20.	30.	25.	30.
Martin White.	1.10	1.30	1.15	1.35
Mono.	1.10	1.30	1.15	1.35
Mexican.	1.10	1.30	1.15	1.35
N. D. Diablo.	2.50.	2.50.	2.50.	2.50
Northern Belle.	2.35	2.50	2.40	2.45
Navajo.	2.35	2.50	2.40	2.45
Northern Belle.	1.05.	1.05.	1.00.	1.00
Occidental.	55.	75.	45.	60.
Ophir.	20.	15.	20.	15.
Potosi.	55.	80.	40.	55.
Pinal Con.	40.	50.	25.	40.
Savage.	35.	50.	25.	40.
Seg. Belcher.	1.35	2.30	1.60	2.70
Sierra Nevada.	1.35	2.30	1.60	2.70
Silver Hill.	30.	25.	30.	25.
Silver King.	30.	25.	30.	25.
Scorpion.	30.	25.	30.	25.
Syndicate.	55.	60.	50.	55.
Union Con.	2.00	2.35	1.75	2.15
Utah.	75.	90.	70.	100.
Yellow Jacket.	1.70	2.05	1.70	1.95

Sales at San Francisco Stock Exchange

THURSDAY A. M., May 8.	400 Andes.	15c
50 Alta.	35c	
350 Bodie Con.	30c	
50 Benton.	35c	
130 Belcher.	1.15	
30 B. & Belcher.	1.65	
20 Bodie.	2.00	
700 Chollar.	1.15	
100 Con. Virginia.	20c	
250 Con. Pacific.	30c	
700 Day.	2.50	
450 Excelsior.	15c	
130 Gould & Curry.	25c	
3515 Hale & Nor.	1.90	
220 Mono.	75c	
20 Mexican.	1.05	
50 Martin White.	45c	
10 Navajo.	2.70	
515 Ophir.	11c	
40 Sierra Nevada.	1.35	
150 Syndicate.	35c	
205 Scorpion.	25c	
213 Union Con.	1.30	
AFTERNOON SESSION.	50 Yellow Jacket.	1.85
300 Alta.	1.55	

Meetings and Elections.

UNION WATER, LUMBER, M. & M. Co.—May 5.—Hon. J. P. Jones, President; Benjamin White, Vice-President; E. W. Marston, W. H. H. Hussey and Samuel Gore, Directors; F. W. Bowen, Secretary.

New Incorporation.

The following company has been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

NORTH STAR M. Co., May 5. Capital stock, \$1,000,000. Directors, M. C. Taylor, W. B. Bourn, J. B. Fargo, D. McKay, Jr., C. E. Clark, J. Gleason and A. W. Thompson.

Pacific Business College.

Many of our readers will remember the burning of Red Men's Hall, 320 Post street, which forced the Pacific Business College of Messrs. Chamberlain & Robinson to take up temporary quarters for a season. Now the rebuilding of the Hall in elegant style has given the college back to its old quarters—the same as before but improved in every way. During the vicissitudes of the college, it has retained its hold upon its students, and the return to the more pleasant and commodious apartments has been the occasion for much enthusiasm and satisfaction to all friends of the institution.

The entire upper floor of Red Men's Hall, 320 Post street, has been constructed on a plan designed especially for school purposes, and it is now one of the most admirably arranged educational establishments in the country. At the head of the stairway, which is lighted by an immense skylight, is the business office. This is a room some 15x20 feet, handsomely carpeted and furnished, adjoining the actual business room, with which it connects.

The Actual Business Department

Is a very commodious room, 48x148, occupying the entire front of the building. Along the eastern side of the room are the banking offices and counting rooms, on either side of the teacher's rostrum. These offices are inclosed by glass partitions, and have the usual conveniences of such offices in first-class banking houses. Fronting these offices, in lines extending across the room, are a large number of elegant and very substantial solid black walnut double-sided desks, each for four students. Towards the rear of the building is the recitation room, well designed for the purpose, and is also well lighted and ventilated. Directly opposite the recitation room is the telegraphic department, which is said by an accomplished electrician to be the best arranged room for a similar purpose ever fitted up on this coast. Occupying the rear or northern end of the building is the room devoted to the theoretical department. This is a very spacious and conveniently arranged room, 48x48, lighted on the east, west and north by fourteen large windows, provided with numerous substantial black walnut desks, and perfect in every appointment.

Each room has the best modern arrangements for ventilation, a drinking fountain, and every convenience which will contribute to the health and comfort of the pupils.

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PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

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Should this paper be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent.

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There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First street, a Rutherford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. References as to above can be had upon applying to this office.

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Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scoriafication; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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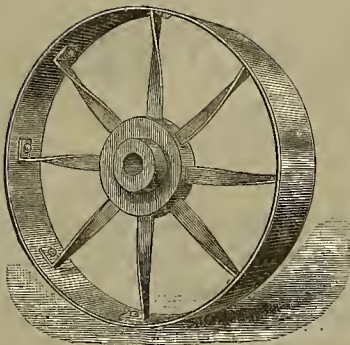
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[Signed:] RICHARD T. MARSH,
Managing Director.

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S. E. Cor. Beale & Howard Sts., San Francisco.
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Kind of Machinery for Mining Purposes.

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Manufacture Iron Castings and Machinery
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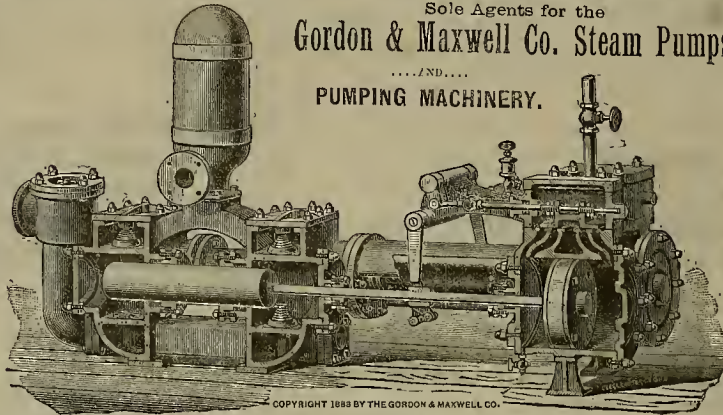
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Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

TESTIMONIALS.

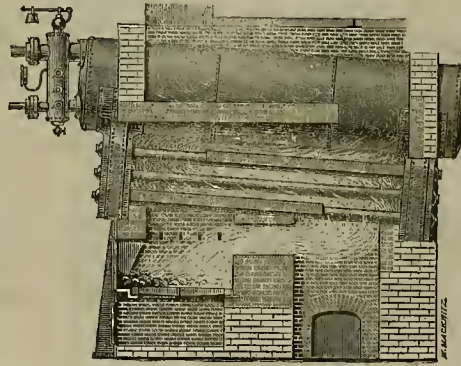
St. Louis, Mo., Sept. 28, 1883

Messrs. Adolphus Meier & Co.—GENTLEMEN: We cheerfully certify that the "Heine Patent Safety Boiler" put up by you in our establishment has proved very satisfactory in its working. The chief points of excellence in the "Heine Safety Boiler" are its economy in fuel and space, freedom from scaling, aptitude for power and heating purposes, working equally well with clear and muddy water. We warmly recommend it to all using steam machinery. Yours truly,

ANHEUSER BUSCH BREWING ASSN.

OFFICE OF Supt. of RAILWAYS,
BERLIN, Sept. 23, 1883.

To Mr. H. Heine, Chief Engineer: In reply to your inquiry of September 24, we respectfully inform you that the three boilers built under your patents under steam since September 25, 1881, at the Alexander Place Depot, as well as the two at Friedrich Strasse Depot, under steam since September 22, 1882, have given good satisfaction, requiring no repairs whatsoever to date. The internal cleaning of the boiler was always accomplished



with ease on account of the convenient arrangement of the tube caps, the adhesion of scales being fully prevented thereby, and the boilers kept in prime condition.

(Signed) BRAUCKE.

Send for Circular and Prices.

F. P. BACON, PRESIDENT

G. L. FOUTS, SECRETARY

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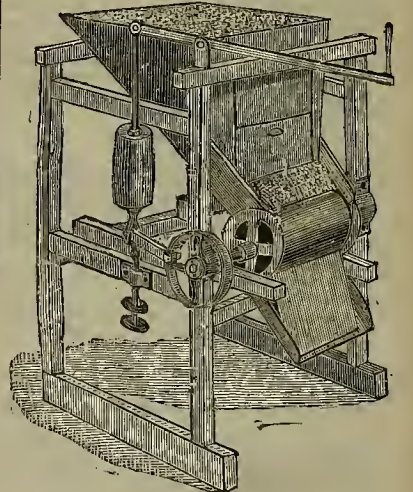
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It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery, as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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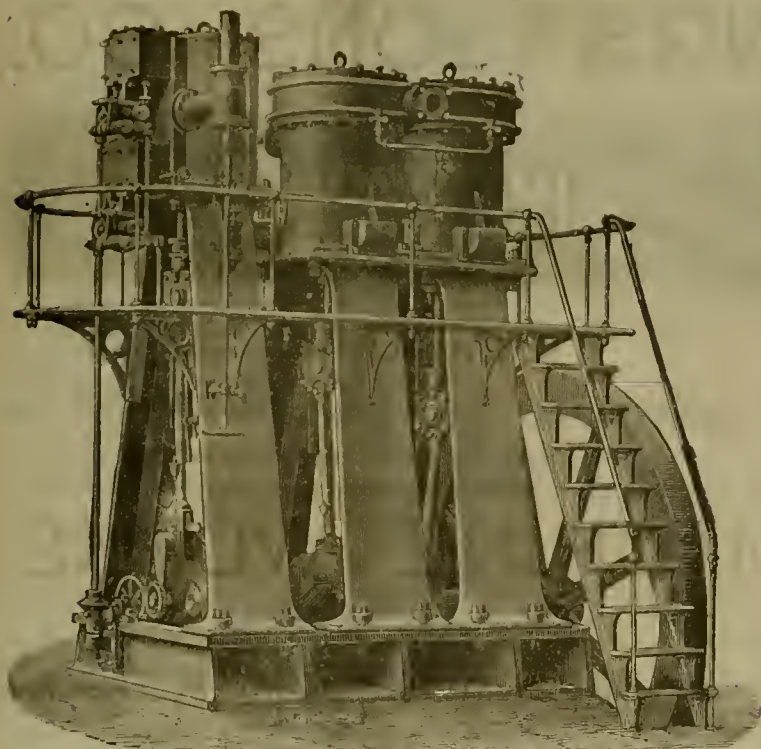
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AIR COMPRESSOR.

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Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

Displacements in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

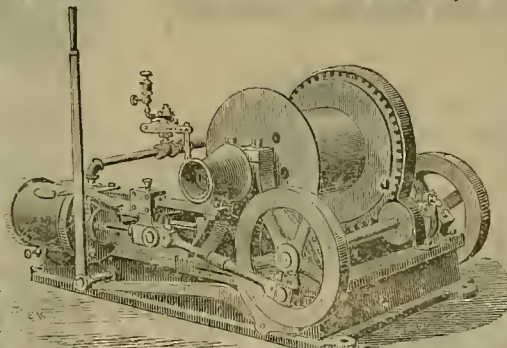
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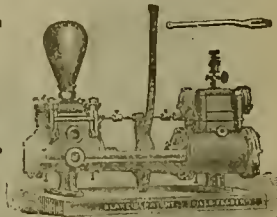
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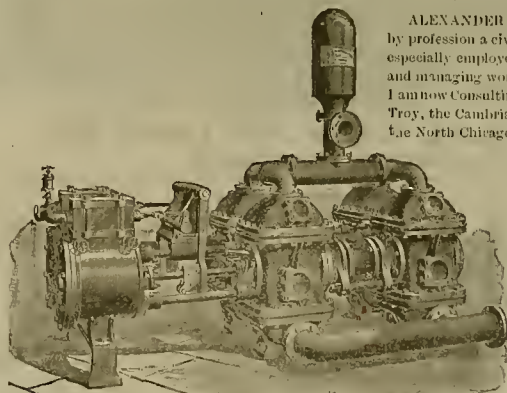
Medal Awarded, Mechanics' Fair, 1882

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IRON CASTINGS OF ALL DESCRIPTIONS.

WORTHINGTON MINE PUMP.



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Will contract to raise any required height single lift with our NEW PATENT MINE PUMP. Recent practical tests in Deep Mines of Mexico demonstrate this to be the BEST MINING PUMP extant. At the largest stock of PUMPS for all purposes west of New York at our

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HENRY R. WORTHINGTON. A. L. FISH, Selling Ag't.

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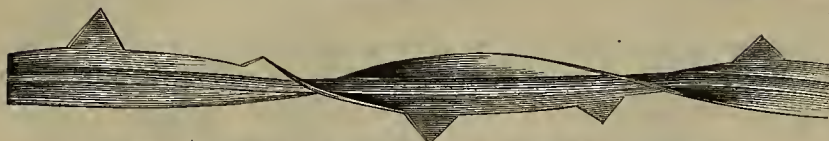
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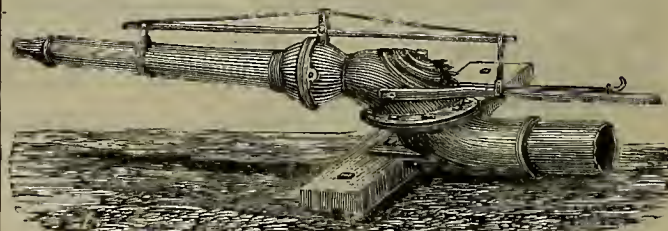
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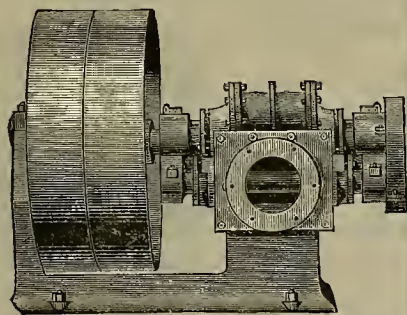
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The best pump in the United States for Irrigating purposes, and will do an equal amount of work with one-third the power of any other pump.

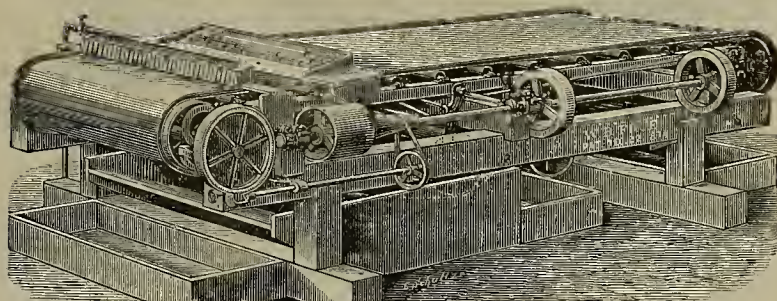
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HOT POLISHED SHAFTING.

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OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal.
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To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

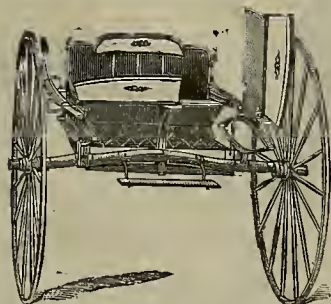
That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

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Room 7—No. 109 California Street,

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SAN FRANCISCO, CAL.



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The Spring Shaft does away with the disagreeable motion of the horse, and the open seat affords easy and safe access from the rear. It costs less to ship, is Light and Stylish and easy riding.

Three men with Adel's Grain Elevator pile up in warehouse, or field, 1,500 sacks in a day. Address:

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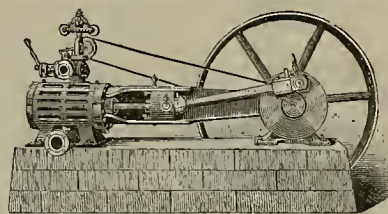
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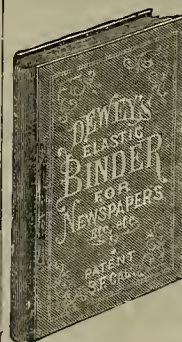
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Heavy Automatic and Slide-valve Engines,
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AN EASY BINDER.—A. T. Dewey's Patent Elastic Binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable, and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Publishing Co.'s journals, Harper's Weekly and Scientific American, 85 cents; postage 10 cents. Postpaid to subscribers of this paper, 50 cents. Send to this office for illustrated circular. Agents wanted.

MILLMEN WANTED.

On or before the 15th of June, TWO thoroughly competent, sober and reliable men to run two 10-Stamp Gold Mills.

Applicants will give references and state amount of wages required. Address,

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Good land that will raise a crop every year. Over 12,000 acres for sale in lots to suit. Very desirable Fruit, Vine, Grain, Vegetable, Hay, and Pasture Land. Near Railroad and Sacramento river; \$3 to \$35 per acre. Wood and water convenient. U. S. Title perfect. Send stamp for illustrated circular, to EDWARD FRISBIE, Proprietor of Reading Ranch, Anderson, Shasta Co., Cal.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MAY 17, 1884.

VOLUME XLVIII
Number 20.

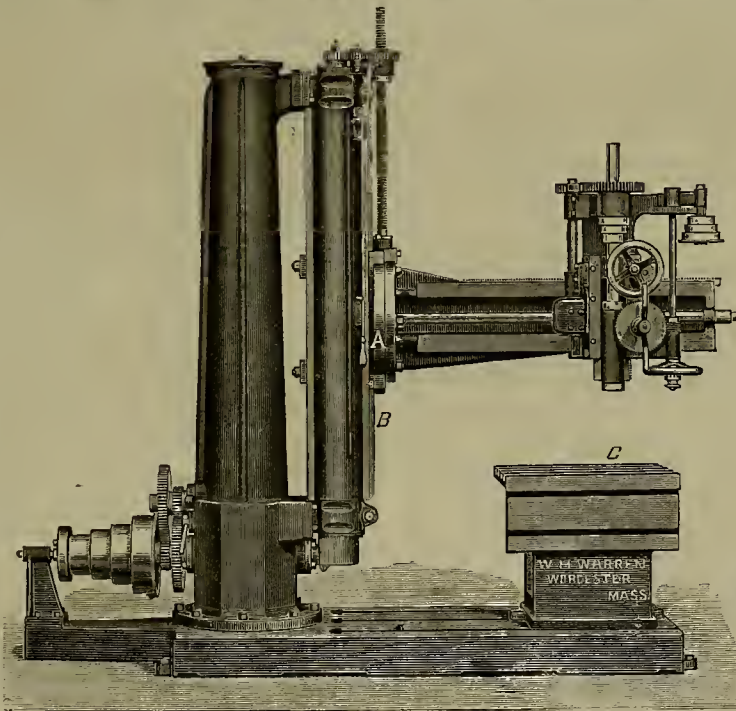
American Blast Furnaces.

The whole number of furnaces in blast in this country on April 1st was 269, as compared with 288 furnaces January 1st. It is, however, right to remark that the aggregate productive capacity of the furnaces in blast April 1, 1884, was \$5,561 tons, as compared with \$3,325 tons April 1, 1883. There is still a larger number of furnaces in operation in the United States, than were in blast in the stagnant spring of 1879, when 241 furnaces were at work. The number of American furnaces out of blast April 1, 1884, was 432, as compared with 334 furnaces at the corresponding date of 1883. The productive weekly capacity of the furnaces in blast in the United States April 1, 1884, may be summed up as follows: Furnaces worked with charcoal, 8,713 tons; furnaces worked with anthracite, 27,612 tons; and furnaces worked with bituminous coal, 49,236 tons. It follows that the aggregate weekly capacity of the furnaces in blast at the commencement of April, 1884, was \$3,561 tons, or at the rate of 4,449,172 tons per annum. The productive weekly capacity of the furnaces out of blast at the commencement of April, 1884, was \$2,679 tons, so that we may sum up matters in general terms, by stating that the blast furnaces of the United States are now only worked at about half their whole strength. Pennsylvania continues, of course, the great stronghold of American metallurgy. The furnaces in blast in Pennsylvania at the commencement of April, 1884, had altogether a productive capacity of 41,662 tons, so that very nearly half the pig iron, which is now being made in the United States is being produced in the single State of Pennsylvania. Ohio is also turning out a large proportion of the pig now being made in the United States, the bituminous coal-worked furnaces of Ohio at present in operation, having a weekly capacity of 8,132 tons. The productive weekly capacity of the furnaces in blast in New England is at present 560 tons; in New York, 5,882 tons; in New Jersey, 1,452 tons; in Maryland, 850 tons; in Virginia, 2,140 tons; in West Virginia, 2,410 tons; in Kentucky, 90 tons; in Tennessee, 2,790 tons; in Georgia, 884 tons; in Alabama, 3,590 tons; in Illinois, 7,400 tons; in Michigan, 2,578 tons; in Wisconsin, 1,535 tons; and in Missouri, 2,200 tons.

HYDRAULIC PUMPS.—A hydraulic sinking pump, of the pattern designed by Joseph Moore of the Risdon Iron Works, of this city, several of which are in use on this coast, has been built in Glasgow for use in a Scotch colliery. The pump is to be placed 600 yards from the engine on the surface. The pressure on the pump plungers will be 310 pounds per square inch, and the pressure on the power plunger 750 pounds per square inch.

Handling Safety Lamps.

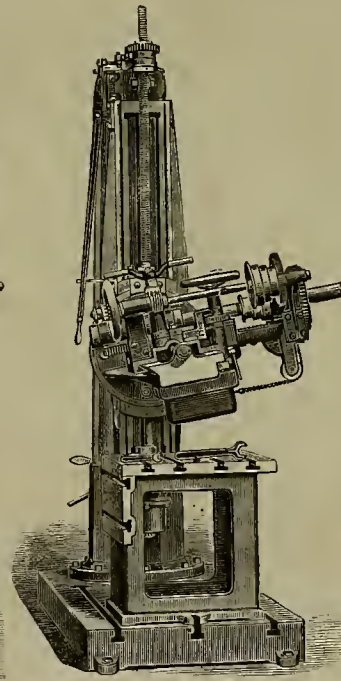
In handling safety lamps in coal mines an expert says that every lamp should be examined before leaving the lamp cabin, and if suitable a lamp cleaner appointed, who will see that no lamp is unfit for duty, being sent down the pit; to be again examined before leaving the lower station, to see whether any accident has occurred since leaving the lamp cabin, and securely locked by the overman or some responsible person appointed for the purpose. A shield should be attached to each lamp, to slide up to and from the top ring of the lamp. The shield should be square cut, and when down should extend to about 2 in. from the top of the lamp, so that when traveling against the air the



Side view, showing drilling spindle in vertical position

Cobalt and Nickel.

We had a conversation this week with Mr. George Lovelock, of Lovelock Station, Nev., who is in San Francisco looking after the crushing and sampling of some ore he has brought with him from a mine recently opened. He brought down 15 tons of ore, analysis of which shows it to contain 12 per cent of nickel, 7 per cent cobalt, and 29 per cent of arsenic. Samples from the same mine, tested in New York showed a result of 28 per cent cobalt, and eight per cent nickel. The arsenic is worth about 20 cents a pound when out of the ore and in marketable shape. The variety of ore is known as "cobalt bloom." It was crushed and sampled here, but there is apparently



Front view, showing drilling spindle in horizontal position.

WARREN'S BALANCED SPINDLE RADIAL DRILLING MACHINE.

flame will oscillate as little as possible, and when slid up a good light will be given all round the lamp. Should any lamp be rendered unsafe by having oil spilt on the gauze, or defective in any way whatever, the flame to be extinguished by gently drawing down the wick with the pricker, taken to the station and examined. At the appearance of firedamp the flame should be dealt with as above; on no account attempt to blow it out, as by so doing the flame might be forced to pass the gauze; or shroud the lamp in a jacket and carefully remove it—proceed to the station and give the report. No one should be allowed to continue work where such indications have been seen. Any interference with the lamp beyond trimming the light should be prohibited, and any one witnessing the same should report to the person in charge. Proper supports should be provided for the lamp, and not to be nearer the revolution of the pick or other implements than 3 ft. No lamp should be passed until cleaned and every aperture seen through.

A PROCLAMATION in the Victoria Gazette throws the island lands open to settlement from the first of next month at \$1 per acre.

no market for it in San Francisco, or at any rate no one here seems to care to undertake to work it. There is a regular ledge of this ore with "iron" walls on one side and gypsum on the other. The main ledge is 8 feet wide and adjoining it is a very large ledge or deposit of gypsum 200 feet wide. This has several veins and stringers of ore from 6 inches to 3 feet wide. On the main vein they are sinking an incline following the ore down. These veins are in the East Range of the Sierra, in Table Mountain District. The mineral region extends down southerly as far as Stillwater, the county seat of Churchill Co., Nev. The country is full of mineral, though few mines have been located. Mr. Lovelock says there is copper, nickel, lead, silver, etc. The range is thickly timbered and there is plenty of water. The particular place referred to is 40 miles from Lovelock station, where Mr. Lovelock has some copper property of value also.

The Belknap trail has been completed to Eagle City. Freight is now carried over this route at 8 and 10 cents, traffic men guaranteeing all freight to go through in two days. Passengers fare is \$12.

The Warren Drilling Machine.

The engravings on this page represent the Warren latest balanced spindle five-foot radial drilling machine. There are only two of these machines so far in use on this coast. One of them is at the Central Pacific Railroad shops in Sacramento, and the other at Joseph Enright's, San Jose. The balance weight runs on planed grooves, and requires no adjustment in the position shown. The greatest distance from the center of the upright shaft to the center of the spindle is 56 in.; bead traverse on arm, 36 in., and the arm radiates a complete half circle. The distance from the spindle in its highest position to the floor table is 64 in., but it may be lowered to 15 in.; the arm is raised and lowered by power. The head is moved on the arm by means of a hand wheel, so arranged with gears and rack that the operator can move it quickly, having the advantage of being over his work instead of using the screw at the end of the arm. The steel spindle is 2½ in. diameter, 14 in. traverse, driven by 3½ in. belt, on a cone of four changes; back gears six to one, with double power in head, and spindle varied by eight motions. The arm can be turned to any degree, as it swivels on a graduated shoe A, which is planed on tracks on the vertical bed B, secured by four large bolts. The utility of having the shoe planed on tracks is manifest. When the operator desires to throw the arm over and drill in a horizontal position, he can raise and lower the arm to accommodate the drill and counterbore, and yet retain its exact position with the work. The quick return

and feed act the same in all positions. The great distance between bearings on the vertical bed, B, obviates the necessity of tightening and loosening the grip bolts on any surface drilling, thereby saving a large per cent of time. C is a portable table, which can be readily detached, and large work placed on the floor table, the extreme dimensions of which are 102 inches long, 32 inches wide, provided with three slots. On the back of the floor table a bearing 32 inches long, 6 inches deep, is planed true with the table, to admit of a T extension. The shafts are steel and bearings long and large. The shipping weight of this tool is 6,000 pounds. The Berry & Place Machine Co., 8 California street, are agents for this coast.

THERE is much uneasiness in the Northwest Territory, many Indians having left their reservation. The trouble is attributed to the swindling operations of Canadian and American officials, and the furnishing of provisions to the Indians unfit for food, and which have caused much sickness and death among them.

THE United States flag-ship *Hartford* is at San Pedro with one of her cylinders broken.

CORRESPONDENCE.

Warranted, unendorsed, opinions of correspondents.—Eos.

Stoppage of Gold Mining.

[Written for the Press by ALMARIN E. PAUL.]

When we analyze the action of European nations, and our own people as well, there seems to be a very anomalous condition of ideas as respects gold. In Europe and among the bankers of our own country, there is a desire to have only one metal for a currency—to wit, gold, and at the same time there is a settled tirade against mining for the very metal they seem to think only suited for a circulating medium.

This paradoxical condition is greater in California than elsewhere in the world. Here all values are based on gold only, and here the effort to destroy gold mining is more deep-set than anywhere else, so much so that we may say one decision of one very wise judge will cost the people of this State one hundred million of dollars before the ruinous effects of it are fully overcome. That we are moving on to a financial crisis is as certain as that silver mining is being destroyed by the heavy discount and tirade against silver as a currency; that gold is transported to Europe by millions weekly; that gold mining has no favor in the eyes of the banker, who should foster it, and that gold production is declining the world over. The decline in our gold production is to-day seriously felt in San Francisco, and many say in the whole State. The interior banks are so pressed, in consequence of their support of the wheat interest at the expense of gold production, and wheat proving by sale an un-gold producing crop, they now call on the San Francisco banks for loans of gold to carry them through. They may get help to a limited extent, but this will not mend matters. Gold has got to be returned. Pay-day will come, and wheat is not gold as formerly, except at unwholesome figures disastrous to farmer, merchant and the country banks. To-day the gold miners of California hold a great power in their hand, for if they were to store the gold they produce, and not allow it to enter the channels of business, they would soon set business men to thinking, and soon there would be a cry for undoing the villainous laws that have ruined so many hard-working miners. I do not advocate such a course, and yet it would be a just retribution for the injury enacted. Of all the States California should be the most prosperous, from the fact that her mountains are stored with the most valued metal, and yet the laws, courts and her own people spend their power and money to prevent production and to keep mining capital away from investing in her gold-producing properties, making a double loss, money for investment and money from production. As water will find its level, so will all this find its balance in the distress which the lack of production will bring about.

Let me ask: Suppose gold miners the world over should stop mining for five years, what would be the result?—Universal stagnation of business, riots and civil wars. The per centage of poverty and labor troubles is in the same ratio as the lack in the production of gold, as long as gold is the standard of values. California business is suffering greatly now, and every bank and business house in the country is going to pay the penalty of this non-production, the sooner they realize this fact the sooner will there be prosperity. An illustration of this whole idea may be found in Nevada county, where a whole section is mostly depopulated by the late decisions. Those who do remain are idle, yet necessarily consumers. Business is ruined and there is no production. Draw the contrast with a large population, active and with "clean ups," of from \$100,000 to half a million a month.

To take commercial statistics, there are over fifty ships in the port of San Francisco idle—as we have no paying freight for export—wheat as prices rule is as dangerous to the financial safety of any business firm as dynamite. Wool is dull from over supply and so we are getting badly worsted. Our wine interest may be profitable in one sense; but if it brings gold how much goes to the account of idleness, pauperism, insane asylums, prisons, prostitution, suicides and murders.

We have lost the northern trade to a great extent, and perhaps soon the English, India and China transfer trade may go by the new Canadian line across the continent. Thus with all our industry and advantages of climate etc., we keep getting back licks faster than is pleasant. The sooner there is a general taking account of stock as to what we have for profitable shipment to enrich ourselves from, the sooner will all appreciate the fact that gold production is the most valuable and certain of all. We don't have to run far to get wealth from it—it is king of all.

LADY BRYAN.—The new hoisting works that are being put up by Hon. C. C. Stevenson on the Lady Bryan mine, Flowsy District, will soon be ready to start up. The building is up and nearly all the machinery in place. These works are being put up on a south chimney of the lode in which no work has heretofore been done, and where a great amount of paying ore has been found immediately upon the surface.

Metallurgy of Nickel.

(CONCLUDED FROM LAST WEEK.)

Christoffe, of Paris, had just erected extensive works at St. Denis, and had made a most brilliant display of his products in one of the main avenues of the exposition. The Vivians, of Swansea, and other exhibitors, had large cases filled with beautiful objects of hollow and solid ware of nickel-silver. Amid these various exhibits of striking *tours de force*, the modest little show-case from the United States, with examples of manufactures of pure wrought nickel, not alloy, could hardly be expected to excite attention and win the golden award which was most cheerfully accorded as soon as the fact was demonstrated by analysis that the objects were really of the pure metal. Some of the objects shown at that exhibition have retained their brilliant polish and luster unimpaired to this time, without being rubbed or cleaned. These notable advances in the metallurgy of nickel, made with the leu and sulphureted ores of Lancaster Gap, prepared the way for greater advances. Dr. Fleitmann, of Iserlohn, Westphalia, Prussia, who was for a time engaged at the works in Camden, has improved and cheapened the operation of refining nickel and toughening it, and has reduced the liability to the presence of blow-holes in castings by adding to the molten charge in the pot, when ready to pour, a very small quantity of magnesium. This is immediately decomposed, magnesium is formed, and graphite is separated. It would seem that the magnesium decomposes the occluded carbonic oxide, or reduces it to a minimum.

The magnesium must be added with great care, and in small portions, as it unites explosively with the charge. It is stirred in. About one ounce of magnesium is sufficient for 60 pounds of nickel. Three-quarters of an ounce to 54 pounds of metal has been used with success by Mr. Wharton. The nickel from the ore at Lancaster Gap seems not to require as much as the foreign metal. It is to be noted that complete malleability of nickel was obtained at Wharton's works in Camden before Fleitmann's invention or process, but this last is more rapid and better than the old method. Nickel so treated with magnesium has been rolled into sheets as thin as paper. The metal becomes remarkably tough and malleable, and may be rolled into sheets and drawn into wire. Cast plates can be successfully rolled. The cast plates, such as are made for anodes, after reheating, are rolled down to the desired thickness. It is found that it is a great improvement to the nickel anode plates to roll them down. They dissolve with great uniformity in the bath, and do not crumble away in the wasteful and annoying manner of cast anodes.

Expensive works for rolling nickel have been recently erected at Camden, containing among other machinery two trains of 40-inch rolls 18 inches in diameter, with annealing ovens and their adjuncts, and a 90-horse power engine. At present this mill as well as the works for producing the metal, and the mine, also, are shut down, and have been since January 1, 1883. The largest sheet yet rolled at Camden was 72 inches long and 24 inches wide, of pure nickel.

Dr. Fleitmann has also succeeded in welding sheet nickel upon iron and upon steel plates, so as to coat them equally on each face with a layer of nickel. The quantity preferred by weight is 8-10 iron and 2-10 nickel, 1-10 of nickel being placed on each surface. To secure union, the iron or steel must be perfectly flat and clean. A pile is made with outer facings of sheet iron to protect the nickel from scaling. When the whole is heated to the proper degree, it is passed through the rolls. The two metals become so firmly united that they may afterwards be rolled down two or three together, or separately to the thinness desired. At the recent meeting of the Institute of Mining Engineers at Boston, a full series of examples of forging and rolling nickel was shown. Samples of rolled metal were exhibited cut from sheets made at the Camden works. These consisted of one sample, No. 20 gauge, 10 per cent nickel; one sample, No. 22 gauge, 10 per cent nickel; one sample showing edge of sheet. These were all examples of nickel upon iron. There was also shown a thin sheet of pure nickel annealed.

The physical properties of the two metals—iron and nickel—are so nearly the same that they work well together, and they adhere tenaciously. The nickel surface cannot be removed or regained in the scrap and waste except by dissolving out the iron core by dilute sulphuric acid. In the earlier experiments the ingots, or cast plates, were beaten under the hammer; this produced a great deal of scale and waste, as with iron, but this is now avoided, partly by the device of a thin covering of sheet iron, which is afterwards dissolved off. Dr. Fleitmann claims to have produced steel wire similarly coated, and proposes to make nickelled boiler plates.

The applications in the arts of such nickelled iron sheets will readily suggest themselves. Up to this time the most direct uses seem to be in making hollow ware, particularly ordinary vessels. The manufacture of such ware has already begun at Schwerte by Dr. Fleitmann, and a great variety of vessels, such as saucepans and kettles, have been turned out, some of them of pure sheet nickel. They are all very beautiful in appearance, resembling highly-finished platinum vessels more than ordinary ware. When

planished and buffed off, the surface becomes like a mirror and will answer the purpose of one. The vessels already sent to this country as samples are made of nickelled iron, and show the facility with which the compound sheet metal may be stamped, spun up and polished. This ware is far superior to tinned iron or tin-ned copper for cooking in. Experiments have shown that it is not poisonous.

The nickel is not only less liable to corrosion, but is harder, will last longer and cannot be melted off by overheating. The ware is lighter and stronger than tin or copper ware; is susceptible of a high polish, and is not easily tarnished. It is well adapted to the manufacture of dishes, salvers and covers for the table. The coating of nickel applied by welding is stronger, tougher than that deposited by electrolysis, and appears to be less liable to scale off. The electrically deposited metal is in some cases very brittle, and no doubt contains sufficient hydrogen to essentially modify the physical characters of the coating.

This new application of nickel constitutes practically a new industry of great importance. It increases the consumption of nickel, and will stimulate its production, and by giving a steady demand will no doubt lead to a more uniform and constant supply.

Placer Prospects.

Gold is found in all the gravel beds along the eastern base of the high Sierra, from the Big Meadows, north of the old Dogtown diggings, to the gorge through which Owens river passes from Long to Round valley, a distance of about eighty miles. Gold-bearing gravel beds interstratified with quicksand are found on the high mountains of massive clay lying between Mill and Lee Vining creeks, and overlooking Mono Lake. Some of the latter beds are 10,000 to 11,000 feet above sea level and from 3,000 to 4,000 feet above the subjacent valley of Mono Lake, and are of precisely the same character as those found at depth in Rancherie gulch, on the east flank of the Old Mono diggings. The old Dogtown and Mono diggings were fabulously rich; good pay was obtained along the gulches between Lee Vining and Bloody Canyon creeks, and between the latter and Parker canyon. Rush creek—next south—heads up in the lava fields, where one arm of the great primary volcanic fissure of the eastern slope rent the summit of the range obliquely from the main parallel fissure to the head of the North Fork of the San Joaquin, and buried or vitrified the gravel and placed the metal beyond the reach of man. The same may be said of Deadman's creek, the main tributary of Owens river, except that Deadman's emerges from the scoria and ash into the gravel zone before reaching the valley. In consequence of this lavatic outpour—evidently occurring subsequent to the deposition of the gravel—there is a break in this auriferous gravel deposit, extending from Rush creek to the canyon leading up to Mammoth City. South of the last-named point, however, it reappears and extends for many miles, coarse gold (one chispa worth \$5) being found about the mouth of Convict canyon. The southern end of this gravel range has scarcely been looked at, the few prospectors who have explored that uninhabited region having confined their operations to the higher mountains, in search of quartz. Doubtless some day rich diggings will be struck at several points along this range, and hydraulic streams leap from every canyon, and sluice streams from every ravine and gulch.—*Homer Mining Index.*

GLOOM IN PATTERSON DISTRICT.—A correspondent writing us from Clinton, Patterson District, in the north-western portion of Mono says: "This has been a tough winter in this section. There is lots of snow here yet. There is very little doing in Patterson District at present. There are five or six men working at the Silverado mine, about four miles from Clinton, and some men have come out to put up a mill for the Silverado. I understand it is to be a 5-stamp mill. The Summers mill and mine were turned over to their creditors, and it is about all the people here can do to live. The crash came with the heavy snow storms, when the people were out of grub and could not get out anywhere to get any, and the storekeeper closed his store to those who were without money; consequently they were left in a bad fix. I believe the Summers mine trouble has now been settled. They have issued stock to the amount of about 100,000 shares. There are between sixty and seventy shareholders in the concern, the stock being issued at thirty-five cents per share. Eight or ten men have taken a contract to take out ore from the Kentuck (Summers) mine, to be crushed at the Summers mill. The contractors are to pay for the packing, and get half the bullion as it comes from the mill. I understand the proposition is to run the Summers mine and mill this summer, but the Kentuck mine is gouged out in such a manner that it is difficult to get out any ore without a great deal of expense. I have also understood that there is to be a mill put in Sweetwater Canyon some time this summer, but the way things look now I don't think there will be much progress made in Patterson District during the current year. I have been in a great many camps since I have been on this coast, but this beats them all. There is not a dollar here nor any show to get a dollar." *Homer Mining Index.*

Political Malaria.

Eternal vigilance is the price of liberty. What does it avail if our ship of state be stoutly built and on the finest model, if the captain be incompetent or in collusion with the pirates, and the crew drunk? The decay of all great States has begun at the height of prosperity, just when, to all outward appearances, they were entering on a long and glorious career. Great revolutionary excitements are apt to be followed by a season of repose, when patriotic vigilance, from a sense of safety, falls asleep. While Greece was building the monuments of her brave dead upon the battle fields of Salamis and Marathon, decorating in poetic lays the memory of their heroic deeds, giving herself up to the most daring commercial adventures, the fascinations of pleasure, polite learning and the elegant pursuits of art and literature, corruption was silently eating at the core of her Government, and when at last the voice of Demosthenes awoke the people from the spell of lassitude and indifference, it was too late. We have much to be grateful for as a people. Our country is prosperous at home and honored abroad. Our credit is unparalleled. And then we are in the gulf stream of the world's political thought, and it ought to be a matter of just gratification that our nation has taken the lead in the movement. But we seem to need an occasional scandal in high places to awaken the apathy of public sentiment to the need of a high moral integrity in our public men. The ease with which unscrupulous men get into power and gain control of public affairs is the only great danger that is apparent in our Government. The apparent indifference and unconcern with which the people trust the property, reputation, marriage, chastity and the public weal to men boorish in manners, ignorant, unable to manage their own affairs, notoriously given to animal indulgences, crafty, selfish, rapacious, and in the market ready to be sold to any bidder, is amazing. Let us see how this matter concerns us all. The men we place in public trusts become the exponents of public virtues. They are representative men. Wherever they go their shadow falls to heal or hurt. In every town, and city, and community they are in some degree looked up to and consulted by their constituency. The young men look to them for example, and the old men quote them as oracles. No man, no matter how small he is—and some of them are quite infinitesimal—can be hoisted upon the pedestal of office and public favor and stand there as harmless as a marble statue or the wooden Indian before a cigar stand. His character for good or ill will be felt in spite of him. Now, if that man be mean, low, coarse, vulgar, a double-tongued trickster, an unprincipled time server and wire-puller, a thieving scoundrel, he will harm the public morals on a wider scale, and diffuse the subtle poison of his own example more thoroughly and fatally than a bad man possessed of more intellectual power and grace of manner out of office, just because his position is more public and noticeable. And one of the most painful facts in connection with this matter is the almost universal apathy of the masses to the moral conduct of their public functionaries. Why, it has passed into a proverb with many that we should not expect and require as high moral honor and integrity of politicians as we do of business men. That men under congressional and legislative formalities, in caucuses, handling the ropes of an election or dispensing public patronage, may do for themselves, their friends and party, what in the common interchanges of social life and in business relations would be denounced as indecent and dishonorable.

Very few of our public men escape the taint of the malaria. It is notorious how many of them come home hemmied in honor and principle, and skulk round to the ring-tailors and political boot-blacks, to be brushed and shined up for another campaign. The fact is the average politician will steal if he gets a good chance; and this state of things cannot be remedied by merely turning out one party and putting in another, for the men of all parties possess the same passions, aims and ambitions, and under the same pressure of circumstances will do the same things. We can hope to see an improved state of political morality only so far as the mass of the people rise above all party feeling, all traditional prejudices, all local and selfish interests, and shake themselves free from all cliques, rings and drill clubs; so far as in generous rivalry, see which side can excel the other in producing the best men for office, men with the finest brain and culture combined with the most fixed and substantial habits of honor and integrity.

MINING IN NEW MEXICO.—There has never been a brighter outlook in mining industry than at present in New Mexico. The different machinery for the reduction of the ore is in full blast in mining centers, and high grade ores seem to be the rule. New Mexico is attracting the attention of mining men of Colorado, California and all old mining regions from the fact that our ores are rich, easily worked, and the climate all that could be wished for, no late springs or severe winters. New Mexico is on the eve of a very extraordinary successful mining career, and one that will be lasting.—*Las Vegas Gazette.*

MECHANICAL PROGRESS.

Grecian Stone Cutting.

A rather interesting observation has recently been made upon the methods of stone cutting employed by the ancient Greeks. Every one knows that the marble blocks of which the Grecian masonry was composed are put together without mortar, and so nicely fitted that in many instances two adjacent stones have, as it were, grown together by the cohesion of their particles, brought into almost absolute contact, a fracture made by a blow upon one passing directly into the other, just as if the two formed a single block. With regard to the fitting of the drums of columns, Mr. Penrose, the most scientific and practical of all investigators of Greek architecture, believes that the desired effect of close-fitting was obtained by inserting a wooden pin as a pivot in the drill holes which are always found in the centers of the drums, and revolving each drum upon the one below it, first placing sand between the stones until a perfect joint was obtained, in the same manner that glass stoppers are ground into bottles, and pieces of metal work of certain kinds fitted to each other. This explanation, which is probably the true one, solves the problem completely, so far as the drums of columns are concerned, but throws no light upon the fitting of the other stones of the Grecian buildings, such as the blocks of the entablature, which are found to have joints as close as those of the columns, the edges of each block, for a certain distance back from the face, being polished, while the rest of the joint is slightly sunk, in order to allow the polished portions to be brought into perfect contact. As no sign of a pivot can be discovered on the stones, even if it were possible to revolve them in contact with each other, it is plain that a different process must have been used for fitting them, and an inscription discovered a few years ago gives us some idea of what the process may have been.

This inscription, which seems to have been a sort of official document, answering the purpose which would now be fulfilled by a printed specification, describes the construction of a temple, and stipulates particularly that the joints of every block of marble must be polished with a mixture of oil and vermilion. As vermilion, if the word so translated really refers to the pigment now known under that name, has no polishing quality, it has been suggested that the color was used simply to spread over the joints before trying the stones together. If any inequality existed in the surface of either stone, it would be immediately shown, on separating the stones after a momentary contact, by the transfer of color from one to the other; and the protruding portion, thus detected, could then be rubbed down by hand to a uniform plane with the rest of the surface. A powder of red chalk is often used by marble cutters for a similar purpose, and it is quite possible that this may have been the only use of the vermilion paint; but there is some difficulty in accounting on this theory for the mixing of oil with the paint, which, if used dry, would be quite as useful for its supposed purpose, and would be much more easily cleaned off the stone. There is no serious improbability in the supposition that the authors of the inscription may have confounded the true vermilion with the red oxide of iron, or crocus, which is a very efficient polishing agent, and if mixed with oil, and applied to the surface of a piece of marble, would serve admirably, both to show where that surface had been brought to coincide with a test plane, and to reduce the inequalities which might on trial be found to exist.—*Am. Architect.*

Separation of Oil from Iron Chips.

The following facts in regard to lubrication and the reclamation of oil under certain circumstances will be of interest to many iron workers and others. We copy from the *Scientific American*:

After good lubricating oil has once been used, coming in contact with the metals and the oxygen of the atmosphere, it has changed its character so much that it is not proper for use as a lubricant, except in the "running through" for lathe and similar work, in cutting screw threads and lubricating for lathe tools. It cannot be returned to the shafts or to the permanent lubricating cups, and do good service. But this once used oil has its second and third use when separated from its surroundings. Oily chips from the lathe, the milling machine, the screw cutting machine, can be cleaned of their load of oil and the oil be returned for use, unchanged except for its semi-oxidation; the contact of iron or of brass will not, of itself, affect the oil. The exposure in dribbles and drops encourages the oxygen of the atmosphere to combine with the carbon of the oil and so change its quality as to prevent its economic use as a lubricant for permanent employment, while it does not impair its value for temporary purposes. For these purposes it does not matter that the oil has partially returned to its base as an acid; its use in running through a screw machine or a lathe is so short that no injury can result. But if once used and exposed oil is fed to shafts and to engine cylinders, the acid from the oxygenized oil will surely make trouble. The proper method of feeding lubricating oil is that of an atmospherically closed reservoir, types of which are largely in use.

But to save oil waste the centrifugal machine is largely in use, and its adaptations

are being extended to comprehend the oily debris of many various manufactures. A recent examination of this contrivance, at an establishment that works steel, iron and brass with oil in streams, shows that the centrifugal machine saves the oil so completely that the resultant turning and drilling chips may be handled without serious soiling of the hands, and the filtered oil appears to be almost as limpid as before using. This appearance is, however, deceptive, for the oil contains chemically, if not suspended mechanically, a large amount of the oxides of iron, steel, brass and bronze, with which it had been intimately associated, rendering it unfit for purely lubricating purposes. But the method of the centrifugal machine is a reasonable and useful one.

TEMPERING STEEL.—In tempering steel, water-mixed with ice gives the best results. One may even insert some small tools to advantage in a lump of ice, as jewelers and watch-makers do when they temper them in sealing wax. Often oil is used, and is preferable to water because it is easily evaporated. Damascus blades, it is well known, are tempered in a strong current of cold air passing through a narrow chink, a temper more uniform than with water being thus obtained. But of all means for this purpose it is believed the most efficacious is metallic liquid, and mercury being the only one known, and always a good conductor of heat, as well as the best of liquid conductors, it has come to be regarded an unequalled bath for the tempering of very sharp steel tools. A very sharp steel, to which in forging it a convenient form was given and which was afterward tempered in mercury, might be equal, it would seem, to cutting through almost any substance.

A POINT IN RESETTING LIGHT TIRES.—A correspondent of *Blacksmith and Wheelwright* says: For the benefit of your readers I will give my way of resetting light tires. I mean those that are bolted on. In the summer time tires are apt to become loose, and the wheel will not wear well when this is the case. My plan is this: I take out the bolts, mark the tire and felly, and drive the felly from under the tire till it falls off. I then get some press paper, such as is used in woolen mills, cut it in strips the width of the felly, and tack it on with small tacks till the wheel and tire measure the same in circumference, or till the wheel is a trifle the largest. I then heat the tire to a black heat, drop it on and let it cool off. If it bursts I sprinkle it a little with water. I put the bolts in the old holes. I never make new ones. This job can be done very nicely, and the result is much better than if the tire was cut and welded or upset. The paper I use is hard and about one-thirty-second of an inch thick.

THE STRENGTH OF BEAMS.—Recent experiments show that spruce beams, loaded to one-half to two-thirds their breaking strain, finally break after a long and steady deflection, which continually increases until the final rupture occurs. If substantiated by further experiments, this fact will go far toward explaining the frequent falling of mill and ware-house floors, under loads supposed by the builders to be perfectly safe. The floors of all such buildings should be sufficiently strong to carry at least five times the weight that can, by any possibility, be put on them, and at least five times as strong as the ordinary load. Where there is running machinery in the building, which is likely to produce jar or tremble, these figures must be exceeded, as the effect of a continuous jar and strain combined is very destructive to the building in which they are found.

THE CARE OF BELLOWS.—"How many bellows have been and are spoiled from negligence in cold weather? They should be oiled two or three times a year to soften the leather, and when not in use (over night), they should be hung up by a chain. But how many smiths or helpers hang them up at night, or when not in use during the day? How many never oil the bellows at all, and leave it lying flat over night? Then on a cold winter's morning, on starting the fire, they give the pole a jerk, and crack, crack goes the leather, and then you will likely hear some strong language about the good-for-nothing leather, and what a poor bellows it is. Clean and oil your bellows before the cold weather comes on."—*The Smithy and Forge.*

AMERICAN EXPORT OF LOCOMOTIVES.—A London journal notes as a fact of special interest to English manufacturers that no less than 151 of the 557 locomotives which were turned out at the Baldwin Works, Philadelphia, during 1883, were exported. Mexico, Brazil, the Argentine Republic, Australia, Cuba, the West Indies, Central America, the Sandwich Islands and Peru, are named as the countries which have been supplied with railway engines from the Philadelphia shops, and from most of these quarters, in future, English manufacturers must expect to deal with American competition.

A NEW ROTARY ENGINE.—Albert H. Gleason, of Wabash, Indiana, has invented and patented a light running and almost noiseless rotary engine. It has a skeleton piston of minimum weight, and its lever power is preserved at a maximum. The engine has but two slides, each with an independent action. Its inlet and exhaust ports are close together, enabling the pressure of a given amount of steam to be utilized for a greater length than can be done in rotary engines where the inlet and exhaust ports are at a greater distance apart.

SCIENTIFIC PROGRESS.

The Northern Polar Sea.

What the Explorers are After.

The recent loss of the *Jeannette* and most of her crew, and the starting of the relief party for Greeley, which has just sailed, is attracting an unusual degree of interest toward circum-polar explorations. The greater the danger, and the more disaster is reported, seems only to increase, in like proportions, the application of new adventurers in this frigid and dangerous field of exploration.

Arctic travelers are all united in an opinion, says an English writer, that birds have told us of regions beyond the frozen seas of the North, where, from some cause or other, the climate is milder, and the ocean or soil more generous. This has been held by many navigators, and each succeeding explorer has confirmed the wonderful story. When Kane, in his small brig penetrated, under unusually favorable circumstances, to the eightieth degree of latitude, he dispatched Mr. Merton with the sledges to reconnoiter, and that able man found, after many battles with the ice, that at the eighty-second degree the icebergs and iceflows over which he had been traveling became weaker, the surface rotten, and the snowdrifts softer, until the dogs, terror stricken, refused to advance, and with much trouble and danger they made their escape to the coast. Mr. Merton then reflected that a great black line he had seen was open water far away to the North, and the unwonted appearance of wild fowl, which had been strangers along the dreary ice packs to the south, convinced him of the accuracy of his belief.

But the aquatic birds were here in thousands, and they seemed to be more numerous in the distant, mysterious north. The Brent geese, the eider and the king duck were so closely packed together that an Esquimaux who accompanied the little expedition killed two with a single rifle ball.

Here we find a curious clew that the birds have given us to the great mystery of the North Pole. From where this was seen to the North Pole is about 450 nautical miles and it may be that milder climates, shut out by mountains of ice ranges, hide what would fill us with wonder. Brent geese, which seem to have prevailed in vast throngs, and may also be known by their wedge-shaped flights, live on marine plants and molluscs. They are not often seen inland, unless flying from one estuary to another, and their presence in these high latitudes is a sure indication of an open sea with feeding grounds, quite unknown further south, on the dreary ice regions that have so long baffled explorers.

Saturn and His Rings.

Numerous have been the theories to account for the singular accompaniment of rings which attend the planet Saturn. To those astronomers who were first enabled to observe this peculiar phenomena it appeared as a single ring, and Maupertuis thought that it was a comet's tail, cut off by the attraction of the planet as it passed, and compelled to circle round it thenceforth and forever. Buffon thought the ring was the equatorial region of the planet, which had been thrown off and left revolving while the globe to which it had belonged contracted to its present size. Other theories also went upon the assumption that the rings are solid. "But if they are solid," asks *Knowledge*, "how is it that they exhibit traces of varying division and reunion, and what are we to think of certain mottled or dusky stripes concentric with the rings, which stripes appearing to indicate that the ring where they occur is semi-transparent, also are not permanent?"

Then, in regard to important physical changes which appear to be going in those rings, *Knowledge* again asks: "What are we to think of the growth within the last seventy years of the transparent dark ring, which does not, as even air would, refract the image of that which is seen through it, and that is becoming more opaque every year? Then, again, how is it that the immense width of the rings has been steadily increasing by the approach of their inner edge to the body of the planet? The bright ring, once 23,000 miles wide, was 5,000 miles wider in Herschel's time, and has now a width of 28,300 on a surface of more than 12,000,000,000 of square miles, while the thickness is only a hundred miles or less.

"In 1857," continues that same journal, "Mr. J. Clerk Maxwell obtained the Adams prize of the University of Cambridge for an essay upon Saturn's rings, which showed that if they were solid there would be necessary to stability an appearance altogether different from that of the actual system. But if not solid, are they fluid? Are they a great isolated ocean poised in the Saturnian mid-air? If there were such an ocean, it is shown that it would be exposed to influences forming waves that would be broken up into fluid satellites.

"But possibly the rings are formed of flights of disconnected satellites, so small and so closely packed that, at the immense distance to which Saturn is removed, they appear to form a continuous mass, while the dark inner mass may have been recently formed of satellites drawn by disturbing attractions or collisions out of the bright outer ring, and so thinly scattered that they give to us only a sense of darkness

without obscuring, and of course without retracting the surface before which they spin."

This appears to be the more rational solution of the problem, and to the excessive bulging of Saturn's equator, which determines the line of superior attraction on that planet. The physical changes which appear to be going on within the rings of Saturn and those upon the body itself of Jupiter are just now the great attractions for astronomers, and appear to be giving us something of an insight into the great problem of world building.

HYDROGEN BY ELECTROLYSIS.—Of all possible methods for the production of hydrogen that of the decomposition of acidulated water by dynamo-electric machines would appear, on the face of it, to be the most extravagant. Yet the question has often been put to the editor of *La Nature*; and in a recent issue the process is explained, and its practicability denied once for all. Supposing a perfect dynamo—that is to say, a machine capable of converting all the work of a motor into electrical energy; and also a perfect voltmeter, having no resistance and using all the current in producing electrolysis of the water. Under these theoretically perfect conditions, a horse power developed by a steam engine will in an hour decompose exactly 166 grammes of water, and set at liberty 18.5 grammes of hydrogen, measuring 296 liters, or 7.27 cubic feet. Supposing that practically the chemical action really utilized by the voltmeter represents 70 per cent of the total energy, it follows that a horse power can only produce 13 grammes, or 146 liters, of hydrogen per hour. The production of a cubic meter of hydrogen per hour would therefore require the total energy of about 7 horse power. Thus the production of 1,000 cubic feet of pure hydrogen by this method would be effected by the expenditure of nearly 200 horse power for an hour; and the probable cost of the process may be left to the reader's imagination.

EARTHQUAKES AND THE CHANGE OF POSITION IN THE EARTH'S AXIS.—At the last meeting of the Geographical Society of this city, Vice President Stevens read an interesting paper on the movement of the poles of rotation, or the change of position in the earth's axis, considered as the cause of earthquakes and the recent great convulsions of nature in Italy, Java and Alaska. The various causes which may be supposed to produce this change of position in the earth's axis of several degrees were considered, and their relative importance discussed. Chief among these causes was mentioned the deposit of immense bodies of sediment, as by the rivers of Thibet, in Central Asia. The disputed question of the solidity or fluidity of the interior of the earth was also considered in its bearings upon the subject. The conclusion was that the problem presented was one difficult of solution, but the time might come when it would be so clearly demonstrated that the wonder would be why the matter had been thought so obscure.

PROFESSOR HUGHES ON MAGNETISM.—In his recent paper to the Royal Society, Professor Hughes dealt with the discovery he has made of the presence, in the interior of a magnet, of waves of opposite magnetic polarity, which balance each other when there is neutrality. In a magnet the polarity at the poles is of one name across the bar, but when the iron is neutral the poles run N S N S..... across the bar. He also deduces the practical results that very thin magnets have greater residual magnetism than thick ones; thick ones have more magnetic inertia, and take longer to magnetize. Bundles of wires are better than solid cores, because they take a higher degree of magnetization, owing to surface exposure; and this is not proportionately counteracted by their higher residual magnetism. Professor Hughes is also of opinion that all matter, and even ether, has inherent magnetic polarity and a saturation point. The curve of saturation for the atmosphere is the same in character as that of iron.

PERSISTENCY OF MICROSCOPIC LIFE.—Among the collections stored in the museum of the Academy of Sciences of this city is a large jar of water taken several years ago from Mono lake. As is generally quite well known, the waters of this lake possess certain chemical properties that not only destroy every form of animal life but even dissolves the bodies and bones, if suffered to remain submerged within it for any considerable length of time. Yet within this jar of water now in the rooms of the Academy may be seen certain microscopic forms of bacteria living and multiplying profusely. This is all the more remarkable from the fact that the water has been reduced fully one-third by evaporation, and of course the destructive elements therein are increased in power by the same proportion.

ELECTRICITY IN THUNDER STORMS.—Physicists have lately been trying to determine by experiment whether the electricity of thunder storms is generated by the evaporation of water or by the condensation of vapor. Freeman and Blake have each obtained results which indicate that no electricity is produced by the evaporation of pure water. S. Kalischer has since made some investigations with delicate apparatus, which have failed to show that condensation or the formation of hail is a source of atmospheric electricity.

EXPERIMENTS MADE WITH GASES UPON INSECTS proved the Colorado beetle hardest of all. It took prussic acid vapor to kill it outright, and was paralyzed in illuminating gas.



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A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:
Saturday Morning, May 17, 1884.

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Passing Events.

The week appears to have been one of financial disasters in the East, many failures having occurred. They appear to affect more particularly the speculating portion of the community however. It has little effect on this coast where we are every day increasing our number of producers, while the other class is happily lessening in numbers.

Tombstone, Arizona, which had a sensation on the wages question last week, now has another on a bank suspension, causing great consternation among the citizens.

Aside from what we give in our usual mining summary, there is little to report from the mines. Work is now going on steadily all over the coast. The prospectors are pursuing their calling on the mountains and hillsides, and a prosperous season is foreshadowed.

The metropolis was in holiday attire on Wednesday, when the Odd Fellows of this State laid the corner stone of their new temple with appropriate ceremonies.

A more hopeful financial feeling prevails in Mexico. The merchants offer the Government a loan of \$2,000,000, on condition the stamp tax be repealed, and it probably will be done.

The Germania Company sent six car loads of white lead to market last week, aggregating 128,813 pounds. This shows that the Utah product is gaining favor in the market.

Coal.

The annual receipts of coal at San Francisco are constantly increasing. The port is the discharging point for large foreign shipments, and is the distributing point also for the Oregon, Washington and British Columbia coal mining companies. As our manufacturing establishments increase in number and size, which they are doing, our necessities for coal are greater. They are being met, however, by the opening and more complete development of the coast coal mines. In the PRESS of April 5th we gave the total yield of Pacific coast coals from 1860, and now append a table showing the annual receipts of coal in San Francisco from 1860 to 1884 from all sources:

1860.....	77,635	1872.....	434,462
1861.....	116,245	1873.....	454,557
1862.....	130,545	1874.....	531,949
1863.....	135,550	1875.....	538,208
1864.....	167,295	1876.....	648,380
1865.....	150,141	1877.....	576,763
1866.....	192,605	1878.....	626,733
1867.....	248,925	1879.....	618,519
1868.....	282,023	1880.....	654,118
1869.....	328,073	1881.....	899,630
1870.....	320,494	1882.....	932,896
1871.....	315,197	1883.....	899,301

Some of our coast mines have increased their product within the past few years, while others have decreased. The Mount Diablo mines in 1882 yielded 113,255 tons, while in 1883 they only yielded 76,162 tons. The Carbon Hill mine, on the other hand, yielded 64,745 tons in 1882 and 140,135 in 1883. From Seattle we received 150,000 tons in 1882 and 139,600 tons in 1883. Bellingham bay used to send us quantities, but does so no longer.

Our foreign coal comes mainly from British Columbia, Great Britain and Australia. British Columbia shipped here 157,762 tons in 1882 and 128,503 in 1883. From Australia we received 158,901 tons in 1882 and 174,143 tons in 1883. The English-Welsh coal receipts here in 1883 were 131,355 tons, and Scotch 21,942 tons. Of Cumberland and Anthracite (Eastern) coal we got 39,856 tons in 1882 and 43,861 tons in 1883. From Renton, Coos Bay and South Prairie our receipts last year were 43,600 tons.

Considerable coal from British Columbia is now being sent direct to Wilmington, the seaport of Los Angeles, from whence it is distributed by rail to the southward. In San Francisco we received the following amounts of coal in April: Carbon Hill mines, 11,250 tons; Renton, 2,250 tons; Seattle, 14,173; making a total of 27,693 tons from the Puget Sound mines. From the Coos Bay (Oregon) mines, 2,422 tons. Of Eastern coal we received 491 tons of Anthracite and 3,100 tons of Cumberland—3,591 tons in all. British Columbia sent us 14,730 tons, of which 820 tons came from East Wellington mines, 8,205 from Nanaimo, and 10,705 from Wellington mines. We received 10,181 tons from Australia. European coals amounted to 4,408 tons, of which 2,194 tons came from Glasgow, 900 from Liverpool, and 1,314 tons from Newcastle-on-Tyne. This makes total receipts 68,005 tons for the month.

Low Price of Copper.

The low price of copper has not stimulated consumption though it is likely that the use of the metal will be larger in the future. The development of the many applications of electricity for lighting; the transmission of speed and power, is progressing so rapidly that the copper interests ought to benefit by it. The quantities absorbed for the construction and renewal of machinery and railroad rolling stock are steadily increasing, and brass is just now all the rage for decorative purposes. Notwithstanding all these elements in its favor there is not much prospect of a permanent rise in this country independent of a simultaneous upward movement abroad. The principal reason of the view is that we are heavy exporters of raw material. So long as the price of copper here is near the parity of copper in London, argentiferous material will seek that market. Favored by lower prices of labor and fuel and working with prices which permits close work, one firm of Swansea smelters can outbid our own refiners. The lower price obtained for copper allowed is more than balanced by the lower cost of working and higher prices paid for silver. The bulk of the Montana matte goes to Swansea. The furnace material would seek a market in this country should any important rise take place here when there was none in England. How long American metallurgical skill will allow the movement it is hard to say.

Quartz.

The crystals of quartz occur in very many forms. Among the crystalline varieties the rock crystal is colorless and transparent. It occurs in fine crystals in most mining districts, but is rarely abundant. The luster of the finest specimens is rather adamantine than vitreous and approaches that of the diamond. The "California diamond" is a familiar example. They may, however, be readily distinguished from real diamonds by their difference of crystalline form and their inferior hardness and specific gravity. Amethyst is a purple or violet crystalline variety which occurs in many localities. Citrine or false topaz is a yellow variety which sometimes occurs in fine crystals. It may be distinguished from the real topaz by the difference of crystalline form, amount of cleavage and inferior hardness.

Ferruginous quartz is reddish brown rather than yellow and often nearly opaque. It is ordinary quartz much colored with oxide of iron of which it occasionally contains as much as five per cent.

Cairngorn or smoky quartz also occurs in crystals. Morion is a black crystallized quartz which occurs in Scotland and in many of the Cornish mines. Siderite or sapphire quartz is of a rich indigo-blue color, and occurs in impure limestone at Golling or Salzburg. Rose quartz in some localities is quite abundant. Milky quartz is nearly opaque, and is the color of milk, sometimes crystalline, but oftener massive. It occurs in many mines, usually in small quantities. Cotterite is a variety from Ireland, possessing brilliant pearly lustre. Sugary quartz is a granular and somewhat friable and massive variety. Floatstone is a cellular variety. Fibrous quartz or cross-course spar is made up of a multitude of imperfect prisms, pressed confusedly against each other side by side.

The crypto-crystalline or amorphous varieties are several.

Chalcedony is milkwhite, yellow, brown or pale lavender blue. Flint appears to be a variety of chalcedony, having the same hardness, specific gravity and chemical composition, etc., but it differs in some respects. Carnelian is a beautiful reddish-brown variety, much used for personal ornaments. Agate is a complex stone composed of chalcedony, jasper and sometimes ordinary quartz. The chief varieties of agate are onyx, which is composed of alternate bands and sardonyx, which includes reddish or yellowish bands. Plasma is dark green and nearly opaque. Heliotrope or bloodstone is composed of green plasma with red jasper. Chrysoprase is apple green; the color appears to be due to oxide of nickel. Prase is dull green and massive.

Jasper is an opaque massive variety colored by oxide of iron or other foreign substances. It is sometimes banded of different colors when it is called ribbon jasper. Basanite or Lydian stone is a dark variety of jasper. Many other varieties of quartz have been distinguished by special names, many of them more or less local in their character. Sagenitic quartz is simply quartz which incloses other minerals or needles crossing each other, such as rutile, tourmaline and the like. Cats-eye quartz is opalescent from the presence of their fibers of asbestos. Aventurine quartz contains flakes or spangles of mica, chlorite, hematite or other foliated minerals. Elhydros is a term which has been used for quartz (and other) crystals containing inclosed fluids. Quartz rock, the different kinds of sandstone, the buhrstone and many other siliceous substances are rather rocks than minerals.

COLLINS MINERALOGY.—Bancroft & Co. have received the second volume of the "General Principles of Mineralogy," by J. H. Collins, which is intended to accompany and supplement the first volume, published in 1878. Like that, it is written for the use of "practical working miners, quarrymen and field geologists," as well as of the students of science classes. The work is little more than a dictionary of minerals, but the author has made it as complete as possible by including notices of all the minerals described. Many of the notices are brief. The work is illustrated, and is in a condensed form which is practically useful. The chemical arrangement has been adopted, which differs very little from that formerly in use in the British Museum, and is identical with that of Dana's "system," so far as the primary classes are concerned.

British Mines.

For two thousand years diligent explorations have been made in the mining fields of Great Britain, and these fields have supplied metallurgical industries with the native material required for their smelting operations. The drain upon the mineral veins has been constant and excessive. It has been repeatedly urged that the rate at which this exhaustion has been progressing has not received the attention which it deserves. Indeed, there has not hitherto been any comprehensive examination of the subject, though it is true that a Royal Commission was appointed in 1866 "to enquire as to the quantity of coal consumed in various branches of manufacture," and to determine the probable duration of our fossil fuel. The mineral resources of the United Kingdom have been far in advance of those of any country in the world. The annual value of the metalliferous ores and earthy minerals raised has approached to eight million pounds sterling, the result of the difficult and dangerous labors of more than 50,000 miners, directed by a large staff of educated engineers and experienced agents.

Mr. Robert Hunt, Keeper of the Mining Records, formerly Secretary to the Royal Cornwall Polytechnic Society, and Professor of Experimental Science in the Royal School of Mines, also, notably, the editor of Ure's "Dictionary of Arts, Manufactures and Mines," etc., has just published a work on British mining, which is a treatise on the history, discovery, practical development and future prospects of metalliferous mines in the United Kingdom.

Mr. Hunt estimates the weight of tin got in that country from 500 B. C. to 1880 at 3,000,000 tons. There is promise, he thinks, of the production of tin in large quantities at increased depths. Respecting copper, he supposes it improbable that the native mines can be expected to prove profitable for some time to come. The produce of the lead mines has steadily decreased, and the silver found in the lead diminished. The inspectors' returns show that the production of the ores of zinc, until recently, has been small. In 1882 the quantity was 16,130 tons, and of blende 32,533 tons. Respecting iron ore, Mr. Hunt says that they have been exhausting their deposits for many years at an enormous rate, producing annually upwards of 8,000,000 tons of pig iron, importing also from foreign sources 2,450,000 tons of ore. The pig iron manufacturers consume considerably more than 20,000,000 tons of ore annually. In concluding his notice of the iron ores of the United Kingdom not in the coal measures, the total production is given in the year 1882 at 12,852,824 tons. The argillaceous ores from the coal measures in 1882 were 11,505,447 tons, the actual quantity of ore used in our blast furnaces being in that year 26,808,069 tons.

The Mining Bureau.

The term of State Mineralogist Henry G. Hanks expired on Thursday of this week. In order to ensure his reappointment the following petition has been prepared and signed:

To His Excellency, George Stoneman, Governor:—We, the undersigned citizens of the State of California, recognizing the fitness of Henry G. Hanks for the position which he now holds, viz.: State Mineralogist, and duly appreciating the success which the Mining Bureau has achieved under his management, respectfully request and urge your Excellency to re-appoint him when his term of office expires: Louis Francoin, J. D. Coughlin, E. E. Eyre, J. S. Enos, C. H. Livingston, C. H. Burton, Wm. A. Piper, Thos. B. Bishop, J. P. Hoge, Wm. Blanding, Aug. J. Bowie, Jr., R. H. Sinton, Geo. Cadwalader, S. Heydenfeldt, Wm. T. Coleman, Louis T. Haggin, J. L. Flood, E. P. Peckham, Lloyd Tevis, L. L. Bullock, H. A. Cobb, J. B. Haggin, Henry L. Davis, Wm. M. Pierson, Geo. T. Marye, Jr., Martin Mangels, C. P. Robinson, S. Heydenfeldt, Jr., Almarin B. Paul, Joseph M. Nongues, W. C. Hendricks, M. J. Kelly, John R. Jarboe, John S. Ilager, W. A. Selkirk, John Rosenfeld, W. S. Keyes, S. L. Jones, Wm. F. Herrin, Wm. Craig, J. H. Crossman, Hall McAllister, W. W. Kellogg, Wm. D. English, Harry I. Thornton, W. W. Foote, Geo. R. B. Hayes, Henry Schwartz, Cou. O'Connor, Jas. V. Coleman, P. J. Murphy, Wm. P. Frost, A. A. Andrews, David P. Levy, T. I. Bergin, George Hearst, C. R. Greathouse, Martin Kelly, Robert Y. Hayne, W. H. Hoberg.

The Secretary of the Chamber of Commerce has been notified by the Secretary of the Harbor Commissioners, that the complaint of the Chamber of Commerce against the dumpings of the dredges into the harbor will receive the early attention of the Commissioners.

Idaho Mines.

Sawtooth District.

Sawtooth District, Idaho, comprises the mining section situated upon the extreme headwaters of the Salmon river, and derives its name from the precipitous craggy peaks (like the teeth of a saw) of the range of mountains bearing the same name. The geological formation of the country is of a very fine feldspathic granite. The veins are in a granitic rock, well defined, and classed as true fissures, having massive breadth and with long-continued outcrops showing their course on the surface. The district has shown its veins to be strong and permanent and the ore to hold out. The silver is principally in the form of rich sulphides. The district is divided into and known as Lake, Beaver and Smiley gulches or canyons, and in each flow respectively creeks of the same names, which are tributaries of the Salmon river. Mr. W. A. Brodhead contributed to the last report of the Director of the U. S. Mint considerable information about this region, and we condense from his statements some details about the mines. The accompanying map will show the location of the creeks, etc.

In Lake canyon the Atlanta mine shows a large, strong vein from four to six feet in width. Adjoining the Atlanta on the east are the Summits No. 1 and No. 2, which are doubtless extensions of the former lode. The Mono, Baxter, Wire Silver, Comstock, Comet and Silver Bow are upon the same belt of mineral as the Lucky Boy and Scotia, and all show flattering prospects. East of Lake gulch is Beaver gulch, in which the town of Sawtooth is situated. It is the oldest camp in the district, and the business center for the mines of Beaver gulch. The Pilgrim is one of the best developed mines. The ore of this mine is principally sulphurets and ruby silver, and the whole ledge is pay rock. Large quantities of the ore average from 3,000 to 5,000 ounces per ton, while the average value of ore is 100 ounces.

The Bidwell and Beaver Extension mines run parallel with the Pilgrim mine, about half a mile north of it; they are owned by a New York corporation. The Sawtooth Company's group of mines are in close proximity to the Bidwell and Beaver Extension mines. The Silver King mine is a "blind vein." It required a vast amount of patient work to find it, but when struck the owners were richly rewarded for their patience and perseverance. Fifteen tons of ore from the top yielded \$500 per ton. The various companies and individuals owning mines here are working and developing for their own satisfaction, confident that it will in the end amply repay them. Another season will be a very prosperous and profitable one for the owners of the Beaver canyon mines.

Nine miles southwesterly from Beaver canyon are the important mines of Smiley canyon. The principal mining camp and supply point for the mines of this vicinity is Vienna, situated about six miles from the mouth of the gulch. The Nellie group consists of five very important claims, owned and operated by a New York company. They are the Nellie, Nellie Extension, Hudson, Champion and Sawtooth. The best developed claim is the Nellie. The others of the group are only prospects, having but a limited amount of work done upon them. The Mountain King is opened by two tunnels, one above the other, with about 100 feet vertical depth between them. The Solace mine has been considerably explored. Thirty tons from this mine were sold, realizing \$10,000. The Vienna is one of the best developed mines in Smiley canyon, and is steadily producing very high-grade ore. The Lion is located northwesterly from and parallel with the Vienna, and has perhaps the largest and richest outcrop of any mine in that immediate vicinity. The Emma is the oldest location in the gulch, and as it is the same vein as the Solace, will, with the same amount of development, make an equally good showing. There are many other mining locations in Smiley canyon worthy of note. A 20-stamp quartz mill has been erected by the Vienna Consolidated Mining Company.

An Unjust Law.

The Postoffice Department of the Government of The United States is, in most respects, so conducted as to be of the greatest convenience to the public in the matter of prompt carriage and delivery and small cost. In some few things, however, there is room for improvement. A case in point may be cited in our own experience. The publishers of this paper are publishers of a journal called the PACIFIC STATES WATCHMAN, which is devoted to the interests of the large and growing Order of United Workmen. The WATCHMAN is in every respect a first-class, semi-monthly newspaper. It is well illustrated, and great care is given by a special editor to its contents. Over 5,000 copies are printed per issue, and 2,000 copies

difference in the mail rates forcibly. There is no reason whatever that there should be this difference. If the Government loses nothing one way it loses nothing the other. The subscribers of one class of publications should have equal rights as those of the other class. It is hoped that on mature consideration the authorities will see fit to change what is very evidently an unjust law.

Smelting Mixture.

The manner in which smelting mixtures are made is not the same in all works, nor is the system of feeding and charging the furnaces the same. In some smelting works the weight of the fuel is stationary, that of the charge or quantity of smelting mixture corresponding to

or charge, as it is also called, is, of course, to mix a large number of tons of ore with iron ore and limestone, or whatever the flux may be, and then weigh out the charges to the feeder. But wherever there is a variety of ores of different character, which may vary in moisture, size and other conditions, an immediate mixture with the fluxes will hardly give a homogeneous material which will make itself felt in the slag. In this case it is better to weigh each component part of a charge or a half charge separately into a wheelbarrow or car and dump it at or into the furnace. A furnace of the above dimensions will take seventy charges per twelve hours, and will require eight men to serve it.

Art Exhibits.

Among the many meritorious paintings to be seen at the spring exhibition of the San Francisco Art Association are several examples of portraiture by S. W. Shaw, which are in the best style of that well known artist. That gentleman has for many years enjoyed a reputation, not by any means local, for his skill in delineating countenances, and portraying on the canvas peculiarities of expression which none but a true artist, with experienced hand, is able to bring out. This ability is one which is plainly evidenced in those portraits which Mr. Shaw has on exhibition. The writer happens to know two of the subjects very well indeed and can testify to the truthfulness of the artist's touch. The picture of Prof. George Davidson, President of the California Academy of Sciences will strike any one intimately knowing that gentleman as an excellent one. The expression is perfect and there can be no mistaking the fact that the artist has caught the Professor's face just as it is. The portrait of C. W. M. Smith, is perfectly true to life. That of Judge Locke, of Oroville, is also a very effective one. The white hair and beard set off an intelligent face, and gave the artist an opportunity to delineate a striking picture, while the likeness is preserved. A smaller portrait by Mr. Shaw, is that of a lady in a modest hat and sealskin cloak. There is a look of warmth and comfort in the picture which attracts one. The head is smaller than the other portraits mentioned.

The tone, color and treatment would make this picture noticeable anywhere. In none of these pictures is there any straining for effect. There are no accessories such as shrubbery, draperies or surroundings of any kind. The artist has sensibly relied on his skill in portraiture alone to make his picture, and in each instance has he succeeded. The flesh tints are natural, and all the coloring subdued so that none stands so prominent as to arrest the eye or detract from the general effect. Mr. Shaw is not only a skillful, but a careful painter, and, having a pride in his work, lets none go from his hands that does not do him justice. He recently completed two portraits of A. T. Dewey and his wife, which have been much admired by their friends for their truthful delineation and artistic finish. In speaking thus positively of the merits of Mr. Shaw's work we feel that we are only giving credit where it is richly merited, and should say no less personally to any reader or friend desiring our opinion in this direction.

THE STATISTICIAN.—McCarty's Annual Statistician recently issued for the current year is a very useful book indeed. This publication was commenced in 1874, and has been improved and added to each year. It contains 624 pages, aggregating 100,000 facts, over 25,000 of which are new to the present number. In the United States 50 different productions are quoted to June 30, 1883; the important events occupy 3 pages, and bring the U. S. Chronology down to January 18, 1884. The new data, regarding foreign countries, occupies about 75 pages, 18 of which are foreign cities with their populations; 6 pages on Japan, answering general questions regarding that country; 3 pages on Mexico, regarding its area, population, states, governors, weights and measures and productions; 4 pages on the important events of the Old World for 1883, chronologically arranged, and brought down to January 20, 1884. The productions, armies and navies, finances, weights and measures and religious creeds of the world occupy 6 more pages; the balance is of a miscellaneous character, and treats upon nearly every conceivable subject. Weights and measures in general, occupy about 25 new pages, on half as many subjects. All the public land concessions to railroads, canals and wagon-roads ever granted or now pending in the U. S. are tabulated. Last but not least, California is treated to about 20 pages, giving all the principal productions for 1882, and the resources and production of the precious metals for 1883.



THE SAWTOOTH MINING REGION, IDAHO.

of these are circulated right here at home, in this city, to actual subscribers, who pay \$2 a year in advance. On these city papers we are compelled to pay one cent postage each. The other 3,000 the Government takes abroad in this State, Idaho, Oregon, Nevada, Montana, Arizona and elsewhere, from 100 to 6,000 miles, at two cents a pound.

With weekly papers, such as the PACIFIC RURAL PRESS, MINING AND SCIENTIFIC PRESS, etc., there is no such difference for delivery in San Francisco, city and country papers being distributed by carriers at the same rate per pound. Why, then, there should be the discrimination we have mentioned in the case of the semi-monthly journals, it is difficult to see. The difference in the class of readers cannot account for it, nor is there any reasonable explanation to be given. The local officials are of course powerless to act except under instructions, and these rules to which we have referred emanate from the headquarters at Washington.

The publishers of this paper are publishers of both weeklies and semi-monthlies, and they have, therefore, an opportunity of seeing the

the fuel variable; in others the fuel is variable and the charge stationary; in still others the weights of both are variable. Mr. O. H. Hahn, an authority on the subject, thinks this latter plan is an irrational one. He prefers the one where the charge is stationary and the fuel variable, because the furnace is less sensitive to a large quantity of fuel taken off than to changes of charge.

The weights of both fuel and ore charges should be adapted to the area of the furnace at the throat, covering it in thin layers. For a furnace which has an area of 4 feet 8 inches by 8 feet 2 inches at the throat, a good proportion is from 192 to 216 pounds of fuel (half charcoal, half coke) and from 800 to 900 pounds of charge, which is fed into the furnace in half charges through two doors and spread uniformly over the fuel. The furnace is kept filled up to the bottom of the charge-doors. The feeding is done by hand, by means of shovels; but it seems that experiments with automatic feeding apparatus ought to be renewed, as they have not had a fair trial.

The best plan for making a smelting mixture,

STEAM PUMPS.—The Dean Brothers' Steam Pump Works of Indianapolis, Ind., have just furnished the Rust Owens Lumber Co., at Drummond, Wis., a system of water works, including pumping machinery, pipe and hydrants, having a capacity of one million gallons in 24 hours. They have also orders for supplying seven distilleries with the vacuum apparatus required for manufacturing spirits by the Woolner, et al, patent process. These orders require seven large independent vacuum pumps with composition cylinders. The new process is said to be a great advance in distillery. The yield of spirits is increased and the old "mash tubs" abolished.

Concentrating Works in Idaho.

The old Faulk smelter, buildings, crusher, scales, etc., located two miles north of Hailey, have been purchased by Jabez Chase, a well known Wood river miner, for the purpose of being converted into custom concentrating works. Mr. Chase has a process which he finds adaptable to many of the low grade ores of Wood river, but not the red oxides. He will combine a first-class sampling department with the contemplated works, and sample and reduce ores at \$5 per gross ton. This will be of material benefit to a number of Deer creek miners, and especially the Davitt mine, where large quantities of low grade galena ore exist.

The founder of this project assures us that it is his intention to engage extensively in the sampling and concentrating business and to probably locate works at Ketchum before long. Jabez Chase, Superintendent of the Davitt & Silver King M. Co., has 60,000 pounds of machinery belonging to the Bradford concentrator now en route to the Silver King mine, at Sawtooth. The process has been shown by repeated and careful experiment to be the only successful concentrator ever introduced on Wood river, and notwithstanding it is a new model, Mr. Chase is confident of its adaptability to any ores in this region. It saves light and heavy mineral with equal success, and is hence invaluable to the many low grade oxides hereabouts, as well as the galena in quartz. This machinery is now awaiting roads to open here north. It will be placed on the Silver King mine to reduce the sulphurets, etc., in quartz, constituting the second-class ores of that mine. A model of the Bradford machine saves from 95 to 97 per cent of all low grade ores on Wood river. But its practicability, while probable, is yet to be tried. It will, however, undoubtedly be successful on the Sawtooth ores.—*Ketchum Keystone.*

ORE IN SMALL LOTS.—Mine owners who will read the advertisement of the First National Bank of Prescott will see that the concern offers to ship ores and make advances at the rate of 85 per cent of the value of all metals that may be carried by any ore. Mr. F. W. Blake, an assayer of 30 years practice, started this ore shipping business a few years ago. He has shipped for the Dosoris, Silver Belt, Pine Spring and other mining companies, all of whom are satisfied with the way in which he has transacted business for them. He is now a member of the banking firm spoken of and gives this ore shipping business more attention than formerly, for the reason that he has more time to attend to it. Rates of all general smelters within thousands of miles of Prescott are recorded in his office; so, also, figures for transporting ore, by wagon or car. If you bring him a ton, three or four tons of ore, he will have it sampled, make advances, if requested to do so, and send it to the smelter that makes the best bid for the class of ore to which your shipment may belong. For this labor, also that of writing letters to smelting men, railroad men and others, his terms are, we hear, very reasonable. In the absence of general reduction works, owners of mines whose ores will "pay to ship," as the saying goes, can help themselves and other people develop their mines and drive dull care away by mining and shipping ores. Silver ore that will pay 52 ounces to the ton, and which will not cost over \$10 a ton to take it from the mine, will pay a profit. There is, there must be, plenty of richer ore in this vicinity, which ought to be blasted out and sold. Better be mining it out than looking for financial Montezumas to come here and purchase mines.—*Prescott (Arizona) Courier.*

CERRO GORDO.—Last Wednesday a representative of the Inyo Independent visited this famous old town, from which in its palmy days millions of dollars in silver bullion were shipped. The town presents a genuine appearance of one of the old-time "has-beens." Twice visited by the fire-fiend, but few of the stately old business buildings are left standing, and of those that remain only a small number are occupied. The entire business of the town, that in its prime boasted a male population of over 1,500, is now done in one building—store, post-office, saloon, etc. There are probably a dozen or more men at work in and around this town. The Union hoisting works and refinery stand out in bold relief, as monuments of the good old days that are gone, and those who live beneath their shadows point to them with pride and say, "The day is not far distant when we will have use for them again."

THE \$20 RATE ABOLISHED.—The \$20 rate on ores between Hailey and Omaha has again been rescinded, and a uniform rate of \$25 per ton given instead. This rate applies to all classes and grades of ore, base bullion, matte and lead, from Hailey to Salt Lake, San Francisco, Denver, Omaha and Council Bluffs. To Kansas City the rate is \$26, only \$1 more. But as the smelting works there pay \$1 more per ton to sellers than works at any of the other points named above, the rate to that place is practically the same, as far as ore sellers are concerned. This new rate was evidently made at the request of the Philadelphia Smelting Company, and is of decided advantage to that company, but the railway company will undoubtedly lose by the change. The railway is rich, however, and can doubtless afford to favor a local company at the expense of its own stockholders.—*Wood River Times.*

On Rock Drills—No. 4.

[Written for the PRESS by GEO. J. SPECHT, C. E., 418 California St., San Francisco.]

(CONCLUDED FROM LAST WEEK.)

A few objections which are usually made by persons inspecting the Brandt drill for the first time are the following:

First. It is complicated in its construction when compared with the percussion drills.

Second. In deep mines no more water is wanted than there is by nature; the Brandt drill being worked by hydraulic pressure, increases by its discharge the amount of water to be pumped.

Third. In regions poor in water, the Brandt drill seems to be impractical.

We will endeavor to answer these objections.

Ad. 1. The Brandt drill is more complicated than the usual percussion drill. This is, however, not the least objectionable, as the manner the power is applied is perfectly quiet and constant; there are no jars and blows, every part of the machine works quietly and is not exposed to sudden shocks. The fact that in an average of 3 years 6,600 feet of drill-holes have been drilled by one machine without causing any damage to the same—against 350 feet of the percussion drills—is evidence enough to overthrow this objection.

Ad. 2. The amount of water used by one Brandt drill is about 540 gallons per one hour drilling. As the drilling in mines will hardly exceed 10 hours per 24 hours the total amount of water to be raised is 5,400 gallons in 24 hours. Assuming that it costs \$158.18 to raise 1,000,000 gallons per 24 hours 1,000 feet high, we have the cost of 5,400 gallons raised the same distance: \$8.53, which is certainly very little.

With percussion drills the water used for cleansing drill-holes has also to be pumped again, which will amount to about the same as with the Brandt drills, as with the latter less holes are needed for the same face and as the discharge water is used for washing the holes.

Ad. 3. The amount of water used in compressing air for making steam and for cooling the air as well as for washing out the drill-holes, is greater than the amount used for creating the motive power in the Brandt drill, as the useful effect of pumps is greater than that of air-compressors. This shows that the Brandt drill certainly can be used in regions where there is enough water to work percussion drills.

The writer of this paper will gladly furnish any desired information about the subject treated.

The most interesting tunnels upon the Gothard Railroad are the circular ones, of which there are three on the north side and four on the south side of the Gothard tunnel. The lowest on the north side is the Pfaffensprung tunnel, which was necessary to overcome a sudden ascent in the valley of the Reuss. Sketch No. 1 shows the whole development of the line at that point.

The spiral is formed by a compound curve of four different degrees, namely: first, 61, then 33, then 57, and finally again 61, and by the adjoining tangent. The length along the line from the tunnel entrance to the point where the upper line intersects the lower one is 6,986 feet, by which development an elevation of 167.5 feet is gained, the grade being 137.3 feet per mile on the open line and 121.5 feet per mile in the tunnel. The spiral tunnel itself is 4,845 feet long. The geological features of it are as follows, beginning from the lower entrance:

A, 1,469 feet, exceedingly hard and compact granite and eurite, very difficult to blast.

B, 1,605 feet, hard granite gneiss, occasionally stratified.

C, 252 feet, micaceous schist in this strata, with beds of quartz.

D, 1,420 feet, same as B.

E, 99 feet, same as A.

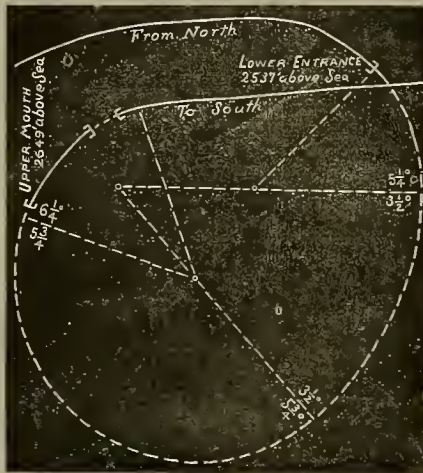
The flow of water from the lower entrance was 1.25 gallons, while the influx at the upper section was 0.44 gallons per second.

The tunnel was worked from both ends with a top-heading, and later with a bottom-heading. The lower heading was worked by machine

drills, while the upper one was driven by hand. The machines employed were at first the so-called Frohlich drill, a percussion drill of European construction. The air-compressors, two in number, were worked by a turbine, which required 527 gallons per second under a head of 31 feet. To obtain this power a dam of solid masonry, 66 feet long, 23 feet high and 10 feet thick, across the River Reuss, and a ditch of 854 feet length and with a cross-section of 21.5 square feet, were required. Four drills and three columns were kept on hand. The wrought iron air-pipe had a diameter of 4 inches, the single length being joined by flanges. The drills are supported by a column pressed by hydraulic pressure against the sides of the tunnel. Three drills, each supported by a separate column, were worked in the face of the heading, which, up to the end of November, 1879, had a cross-section of 86.29 feet, and thereafter varied from 59 to 65 square feet.

Each machine was worked by two men. The drill holes had an initial diameter of 2 inches, and a final diameter of 1½ inches, and a depth of from 2.3 feet to 3.6 feet. Ten to 17 holes were required for one attack, which took from 3½ to 6½ hours for drilling and from 4½ to 6 hours for blasting and removing the debris. The pressure in the compressors was equal to 53 pounds per square inch. Each attack advanced the face from 1 foot to 2.3 feet, according to the nature of the ground. One foot of drift required from 10 to 17 pounds of dynamite No. 1, and from 30 to 88 drills. The repairs on the machines were very numerous, and one or two of them were constantly in the shop.

Toward the end of 1879 it became apparent that the tunnel would not be finished in contract time at that rate of progress (only 364 feet in 105 days), and the contractor decided to employ the then favorably introduced hydraulic rock drills, system Brandt, and also to abandon the top heading and make the bottom heading



PPAFFENSPRUNG TUNNEL.

the advance drift. At the end of January, 1880, all the necessary preparations had been made, and the work with the Brandt drills commenced. On March 15, 1880, the percussion drills were entirely laid aside.

The working pressure on the drill bit varied from 1,050 to 1,450 pounds per square inch. Each machine—two being supported by one column—required 2 men, 8 hours' shift. The interior diameter of the drill rod is 1½ inches, and the exterior one 2 7/16 inches. The bit has four teeth protruding beyond the sides, making a bore-hole of from 2¼ to 2½ inches diameter. Each attack required from 6 to 10 drill holes of a depth from 3 to 5 feet, 3 to 8 hours for drilling, and 3 to 6 hours for blasting and removing the debris. Each attack advanced the heading from 2 feet to 4 feet, according to the rock. One foot of drift required from 6 to 14.5 pounds of Nobel's explosive gelatine, and the sharpening of from 5 to 18 drill-bits.

The connection between the two headings was made at a distance of 3,258 feet from the lower entrance, and a survey showed a deviation of 0.40 feet in alignment, 0.44 feet in length and 0.66 feet in elevation. The total excavation of this tunnel amounted to 92,000 cubic yards.

TABLE 1.—SHOWING DAILY PROGRESS OF ADVANCE DRIFTS IN THE PPAFFENSPRUNG TUNNEL.

	Percussion drills. Hydraulic drill.			
	Smallest daily progress.	Largest daily progress.	Average daily progress.	
	3.23, Dec., 1879 4 92.	4.77, Jan., 1880 8.53.	3.87	July, 1880 6.75
				Dec., 1880 6.75
				Jan., 1881 6.75
	Hand drilling.			
	Lower header.	Upper header.		
	Smallest daily progress.	1.31, July, 1879 1.31.	July, 1879	
	Largest daily progress.	2.61, Dec., 1878 2.85.	Apr., 1879	
	Average daily progress.	2.00	2.15	

While the percussion drills were used the ventilation was procured by the escape of the compressed air, but when the Brandt drills were used, a fan, situated at the mouth of the tunnel, was employed. The air-pipes were of galvanized iron, and had a diameter of 9 inches.

Immediately previous to the connection of the two headings the temperature in the face was 66° F., the outside temperature being 52° F.

Conclusions.

In closing this article I will condense the advantages of the Brandt drill over the common percussion drills, as made apparent by the above details.

The Brandt drill is worked by water under great pressure, varying from 350 to 1,500 pounds. A hollow drill rod and annular drill-bit of hardened steel is constantly and quickly pressed against and into the rock and slowly rotated. The rotation, as well as the pressure, is produced by water; the column bearing the drill is also secured by hydraulic pressure. Even the very hardest rocks are drilled by this machine, without too great a wear on the bits.

The motive power being water, a very high pressure can be used, so that the dimensions of the machine and of the pipes leading the water from the pumps to the drills can be very small. As water is not compressible to any practical extent its use permits a very high efficiency; the water used as a motive power and discharge by the machine is advantageously used to clean and wash the drill-hole, it allows no dust to arise and cools the air wonderfully. The spray of water issuing from the main pipe settles the smoke and fumes of the blast very rapidly and effectually. Even in countries where water is very scarce, the Brandt drill can be used to better advantage than the drills using compressed air or steam, as the water once used by the drills is returned to the reservoir and so is used over and over again. As the power necessary for the Brandt drill is much less than that for the percussion drills, the amount of water consumed by the boiler is less. Rotary drilling, gives a much larger useful effect than percussion drilling; it therefore is very saving in reference to motive power. Small supplies of water, insufficient for any other kind of drilling are sufficient for the Brandt drill. The drill works continuously without blows and shocks; therefore the repairs are very little, nearly none. Holes of large diameter and great depth and in any direction can be bored. The holes are perfectly straight even in the least homogeneous rock; they are perfectly cylindrical for their entire length. The great efficiency of one machine permits to use less numbers of machines and a smaller plant. Therefore the first cost of the plant as well as the cost of working the same is smaller, than that of any other kind of drills.

Shortly repeated, the principal advantages of the Brandt system of drilling are:

- 1.—Less power required and greater percentage of power realized.
- 2.—Small number of repairs necessary.
- 3.—Cheapness of plant.
- 4.—Cheapness of working the same.
- 5.—Absence of dust and noise.
- 6.—Large diameter of bore holes.
- 7.—Effectual ventilation by injection of water under high pressure.

The success of this system is established beyond doubt, as the great many mines and tunnels in Europe have proven. The plants there erected were cheaper than those for percussion drills at the same localities and the work done was also cheaper. The largest progress, 641 feet in one month, ever made anywhere in the world was made by four Brandt drills in July, 1883, in the west header of the Arlberg tunnel, while from eight to nine percussion drills were used in the east header.

It frequently occurs that in deeper mines a natural water pressure can be made available to work these drills directly without requiring any machinery for creating such pressure, which would make the cost of the plant very low. This is successfully done in the mines of Bleiberg and could also be done at the Comstock, New Almaden and other deep mines in the United States.

NOTE.

For this article the following sources have been used, besides private reports and letters: "Der Eisenbahn Unter- und Oberbau, 1879" (a report on the Vienna Exposition, 1879). "Kiedler's Gesell. u. Bohr Maschinen und Luft-compressoren, Maschinen, 1877" (Report on Rock-drills and Compressors in the Philadelphia Exposition, 1876). "Kiedler's Brandt Hydraulische Gesteins Bohr Maschinen, 1877" official reports of the Imperial R. R. Department of Austria. Publications in the papers of the Austrian Society of Architects and Engineers, and the Swiss Journal die Eisenbahn.

ANOTHER important mining sale, says the *Florence Enterprise*, has taken place in the Casa Grande district. It includes the following property: The Captain Luce mine, owned by B. F. Luce; the Copper Elephant, owned by Wm. Dickinson, and the Copper Reef, owned by Jere Fryer and Julius Bauerlen. The consideration for the first named property was \$60,000 and for each of the last two the sum of \$20,000 was paid. The buyer was S. Chamberlain, President of the Casa Grande Copper Company. The properties were recommended and the sale made by Mr. E. O. Kennedy, the well-known mining man of Globe, which is a sufficient guarantee of their value. They are copper properties and lie near the Copperosity.—*Prescott Courier.*

THE TIDE TURNING UP NORTH.—A correspondent of the *Eureka Leader*, writing from Belknap, under date of April 23, says: Since writing you last, another boom has set in, and the people are fairly crazy. The mines are very rich, and work has begun on some of the gulches with magnificent results. On the Dream Gulch, thirty miles from here, they are taking out an average of \$50 a day to the man. The gulch is three miles long. Some very rich quartz claims have been located near here,

ENGINEERING NOTES.

A New Propellor for Steamers.

Joseph Goodrich, of New York, has patented an invention which it is thought by some may revolutionize steam propulsion. The device is certainly very simple and ingenious. The apparatus in question is simply an endless chain of paddles. These paddles, or slats, as they may be called, are fastened in the chain by means of pivots, one on each end, and upon the chain being drawn through the water spread out and present, as a natural consequence, their broadest surface, but are so arranged that on returning to the head of the craft they remain tightly shut, cutting the water edgewise with very little opposition.

Of course one of these chains is attached to either side of the boat, but they are so far under water that their working is not seen, and no wave or commotion is caused. The advantages claimed are first, economy of power and consequently of fuel used; second, the avoidance of the swell often so dangerous to smaller craft in close proximity to a steamer, and third, the safety of the propelling power from the guns of an enemy in time of war. This last advantage is said to be one long sought, and of great importance. The saving of the cumbersome machinery now in use will also be of great importance, and as an illustration of what this saving will be, it is stated that a steamer of the size of the City of Rome, which has machinery weighing seven hundred and fifty tons, can be propelled faster and more steadily under this improved plan, with machinery weighing only one hundred tons.

C. C. Martin, the noted engineer of the Brooklyn Bridge, is interested in the furtherance of this method, and with other New York gentlemen, proposes to fit an apparatus of this kind on one of the largest of the ocean steamers, when an exhibition will be given and a trial trip made.

THE EADS SHIP RAILWAY. Captain Eads gives out that the survey for his projected Tehantepec ship railway is completed. The enterprise, he represents, will be in the hands of a wealthy English syndicate, which will push it to a successful conclusion. The length of the road will be 130 miles, and it is estimated will cost from \$50,000,000 to \$75,000,000. Captain Eads says there is no doubt of his being able to raise the money, and that he will have the road operating within five years. This outlook is doubtless pleasant to Captain Eads, but to Americans generally it gives rise to the reflection that both the railway and the Panama ship canal will be under foreign control, while our Government, which has an immediate and vital interest in both the railway and canal, is a looker-on without voice as to how either shall be managed. It appears as if one of these days there would be a revival and earnest discussion of the Monroe doctrine.

A NOVEL PIECE OF ENGINEERING WORK.—A novel, as well as interesting piece of engineering work has recently been accomplished at Bristol, England, which consisted in the moving of a foot-bridge 134 feet in length, bodily, down the river a considerable distance. The pontoons, by means of which the bridge was floated to its new position, consisted of four 80-ton barges, braced together so as to form one solid structure, sixty-four feet in width, and were placed in position soon after the tide commenced to rise. At six o'clock A. M., the top of the stages, which was twenty-four feet above the water, touched the under part of the bridge, and in a quarter of an hour later both ends rose from their foundations. When the tide had risen four feet the stage and bridge were floated to the new position, when at 8:30 the girders dropped on to their beds.

A JAPANESE ENGINEER.—T. A. Matsvaria, a Japanese educated in this country, is the first man of his nationality who has been chosen to act as a civil officer in the United States. He is the son of a wealthy Japanese nobleman, and came to this country in 1870. After graduating, he determined, decidedly against the wishes of his father and friends, to remain in this country, to acquire some practical experience in his profession, and for some time acted as Assistant Engineer of the Manhattan Elevated Railroad Co., of New York, and afterwards, for three years, Chief Engineer of the Union Pacific Railroad in Wyoming, Idaho and Montana. He has recently been elected as City Engineer of Bradford, Penn.

A NEW STEEL is said to have been produced at Sheffield, England, which is expected to be of incalculable value to the manufacturing and railroad world. It is said to be made "by adding from 7 to 20 per cent of the ordinary ferromanganese of commerce to iron either wholly or to a good extent decarbonized and refined and treated by any of the ordinary processes."

A SINGULAR OCCURRENCE.—A singular accident is reported from the *Derry (Eng.) Standard* to have happened in connection with the insulated electric rail on the Portrush Electric Tramway. A ploughman returning from work on Thursday stood upon the rail to mount his horse, and, on applying his hands to the back of the animal, the brute fell dead, while the man was uninjured as though the current of electricity must have passed through his body to the horse.

USEFUL INFORMATION.

Electricity in Tanning.

Making leather is now essentially the same in principle as it was in the days of the Pharaohs. Improvements have been made in the methods of depilating or removing the hair from hides and skins, and machinery helps to forward the work in both tanning and finishing, but the aid of a vegetable astringent tannic acid is necessary in combination with the gelatine of the hide to make true leather. And this is a long operation, requiring, for sole leather, from four to eight months, and the lighter harness and upper leathers less in proportion. It is now claimed that this long tanning process can be shortened by electricity, and an English patent has been issued with this object. It is well known that the hides being "sweated" for unhairing give off a great deal of ammonia, from the combination of the nitrogen of the gelatinous tissue with hydrogen. This process of decomposition is immediately checked when the hides go into the tan liquors, but the precise chemical reactions which take place in the vats have never been clearly understood. In heavy sole leather it is claimed that in many cases, tannin is deposited by precipitation in the hide cells, besides that which is directly taken up by combination with the gelatine.

A new and improved process has recently been introduced by Mr. L. Gaulard, who has taken out a patent for the same, under the title of "Tanning by Electricity." The skins to be treated by this process, says the *Electrical Review*, are suspended in a solution of tannin contained in a vessel, in the center of the bottom of which is an electrode, another electrode being placed in a conduit, by which this vessel communicates with another vessel. The electric current is then caused to pass in such a manner that the negative pole is in the center of the vessel and the positive pole is in the conduit. Under these conditions, the hydrogen alone acts upon the leather, and causes the rapid destruction of the nitrogenous matter contained therein. After undergoing this treatment for a period of eight days, the liquid in the vessel is removed and replaced by a stronger solution of tannin, making about 20". The current is then reversed, so that the pole in the middle of the vessel becomes the positive pole, and the pole in the conduit the negative pole. The oxygen alone then acts upon the liquid, thereby inducing a rapid oxidation of the tannin, and its precipitation in this condition in the cells formed by the gelatine and fibrine of the hide.

ANOTHER "NEW" EXPLOSIVE.—German ingenuity has produced another derivative from coal tar in the shape of an explosive for mining purposes or firearms. This resultant is a mixture of saltpetre, chlorate of potash and a solid hydrocarbon, the latter being paraffine, asphaltum or pitch. The solid ingredients are powdered and intimately mixed, and the mass is then treated with a liquid volatile hydrocarbon, such as benzine or gasoline, which dissolves the solid hydrocarbon and forms the whole into a plastic body. This cake is then rolled into sheets and hardened by allowing the liquid solvent to evaporate, the product being afterward broken up into grains of any desired size, like ordinary gunpowder. By this method of dissolving the hydrocarbon before or after admixture with the salts, the grains became coated after drying with a waterproof surface of varnish. The new compound is only an explosive when confined in a close space. It possesses the same density as gunpowder, and is very hard.

SPINNING AND WEAVING GLASS.—At Gaudenfel, Germany, the artist and glass-spinner, A. Prengel, of Vienna, has established his glass business, offering carpets, cuffs, collars, veils, etc., made of glass. He not only spins, but also weaves glass before the eyes of the people. The otherwise brittle glass he changes into pliable threads, and uses them for making good warm clothing by introducing certain ingredients, which are his secrets, thereby changing the entire nature of the glass. He makes white, curly glass muffs; also ladies' hats of glass, with glass feathers, which are lighter than real feathers. Wool made of glass, it is said, cannot be distinguished from the genuine article. Glass is a non-conductor, and the time may not be far distant when it will cause a revolution in dress material.

BEST FORM FOR CHIMNEYS.—It is well known that the round form is the best for chimneys in workshops. It facilitates the escape of the smoke and gives less hold for the wind, besides requiring less material for the construction. Round chimneys are, however, difficult to build, and in some places the want of workmen able to make the round kind, has compelled the adoption of square or octagonal forms. To obviate this a European firm makes bricks in the shape of wedges, and corresponding with the radius which the chimney is to have. The Market Street Cable Company adopted the octagonal form in building the chimney for their engine house on Valencia Street.

AN INGENUOUS APPARATUS has been made for Mr. Borden, of Fall River, Mass., which he finds of service in his sleeping rooms. It consists of a small battery connected with an Edison incandescent lamp, which can be lighted up instantly. The circuit wires run from the battery and lamp, located on shelf or table in the

room, to any convenient position near the bed. By a push button, or any other simple method, the circuit may be closed and the room illuminated, the lamp giving about two candle-power. This arrangement of this household convenience was done by Frank W. Harrington, superintendent of the Western Electric Company's factory in Boston, who is now fitting up several for the use of prominent men in New England.

A FOUNDRY HEAT.—A saving of about 80 per cent is made by substituting for the coal-dust and charcoal used with green sand, a careful mixture of one part of tar with twenty parts of green sand. Castings produced from moulds made with such a mixture are smooth and bright, because the tar prevents the metal from adhering to the sand and also the formation of blisters. Such a mixture also adds considerably in the production of large castings, as the tar absorbs the humidity of the sand.

GLASS FLOORS.—In many of the business houses in Paris, and especially in those of which the cellars are used as offices, glass is now being extensively employed instead of boards for flooring. It saves gaslight, and the glass proves, in the long run, full as cheap as, if not cheaper, than the wooden flooring.

METALLIC PAPER is a French invention, and upon it cromolithographs are rendered transparent by a coating and backed with tin foil. The effect is said to be very striking, and the possible applications of the invention are very numerous and useful.

THE ALBUM of the Bank of England in which specimens of counterfeits are preserved has three notes which passed through the Chicago fire. Though they are burnt to a crisp, black ash, the paper is scarcely broken, and the engraving is as clear as new.

GOOD HEALTH.

Something About the Teeth and Mastication.

The following interesting extract from a French periodical we copy from *Health*: "It would be impossible to deny the vast influence which the condition of the teeth exercises upon the general health and many stomach affections. Dyspepsia, for instance, which is so often supposed to spring from remote causes, is, in reality, most frequently one result of swallowing imperfectly masticated food. Reaumur's experiments have long since proved that food cannot be digested unless it is properly broken up. He caused some sheep to swallow tubes full of grass, saturated with saliva, but not chewed. Two days afterward, examination showed that this food had not undergone any digestive change. Spallanzani still more conclusively proved this by causing a sheep to swallow two tubes, the one full of masticated, and the other of whole grass. The chewed grass was digested; the other remained unchanged.

"The state of the teeth not only affects one's bodily health, but also influences character. A bad condition of the teeth, by the prolonged sufferings it occasions, which are aggravated by the most trivial causes, ends by rendering the disposition morose, irritable, and thenceforward inclined to see only the dark side of everything.

"But if it be true that character can be influenced by the state of the teeth, it is also true that the teeth rapidly decay under the influence of overwork? Two English doctors, Messrs. Leithwood and Harlan, believe they have noticed that the teeth of those who devote themselves entirely to study undergo rapid changes, and that a period of rest retards the evil. They then put the further question: Are these occurrences attributable to an over-excited brain, whose excessive stimulation makes it assimilate to itself those phosphatic elements which would otherwise go to nourish the teeth? Or is this decay of the teeth due rather to a low state of health produced by overwork?

"Comparing together numerous facts which have been culled from different isolated observations, Messrs. Leithwood and Harlan find themselves compelled to admit that if the brain be overstimulated by work, the excess of phosphorus which it then consumes can only be gained at the expense of those organs which require this substance for their development, as the bones and the teeth. He advises that the studies of children shall be carefully watched, and so regulated as to be increased or lessened in accordance with the condition of their teeth. He also counsels those young persons who go in for competitive examinations or a university career to exercise the greatest watchfulness over their teeth, if they wish to preserve them."

The Growth of Brain-Power.

The question now arises, says a writer in the *Phrenological Journal*, in speaking of the growth of brain power:—Where in the series of events is there room for any fresh element to come in? Can any man ever be anything other than what some of his ancestors have been before him? And, if not, how is progress or mental improvement possible? That man have, as a matter of fact, risen from a lower to a higher intellectual position is patent. That some races have outstripped other races is equally clear. And that some individual men have surpassed their fellows of the same race and time is also obvious. How

are we to account for these facts without admitting that new elements do at sundry times creep in by chance, in the false and unphilosophical sense of the word? How can we yet advance unless we admit that exceptional children may be born from time to time with brains of exceptional functional value, wholly uncalled by antecedents in any way?

The answer to this question is really one of the most important in the whole history of mankind. For on the solution of the apparent paradox thus propounded depend two or three most fundamental questions. It is by this means alone that we can account, first, for the existence of great races like the Greeks or the Jews. It is by this means alone that we can account, secondly, for genius in individuals. And it is by this means alone that we can account, thirdly, for the possibility of general progress in the race. It is surprising, therefore, that the question has so little engaged the attention of evolutionary psychologists at the present day. There are only two conceivable ways in which any increment of brain power can ever have arisen in any individual. The one is the Darwinian way, by "spontaneous variation," that is to say, by variations due to minute physical circumstances affecting the individual in the germ. The other is the Spencerian way, by functional increment—that is to say, by the effect of increased use and constant exposure to varying circumstances during conscious life. I venture to think that the first way, if we look at clearly in the face, will be seen to be practically unthinkable; and that we have therefore no alternative but to accept the second.

OVERWORK.—A large amount of sentimental rot gets into print about men killing themselves by overwork. In nine out of ten cases of this kind, the true cause of death will be found to be something besides overwork. We all know professional and business men who work harder than they ought, and yet by taking good care of themselves in the way of diet, exercise, etc., manage to enjoy good health and wear a cheerful hearty look. Those who die from "overwork" generally use liquors and tobacco without moderation, keep late hours, and indulge in hazardous speculations outside of their legitimate business. Late hours, liquor and tobacco engender weak nerves and upset the functions of the body, while anxiety over speculative schemes acts on the brain. With these evil agencies working against a man, some slight exposure brings on an attack of illness and the whole body being weakened, gives way in a very short time. The sudden illness and speedy demise baffle medical skill, the stricken family and shocked friends are told that overwork was the cause of death, and the press deplores the tendency of our civilization to kill people by overwork, when the real cause of nine-tenths of these deaths is as outlined above.

CURE OF ELEPHANTIASIS BY ELECTRICITY.—An interesting communication on the treatment and cure of elephantiasis among Arabs by Doctors Monrovo and Silva Arango has been presented to the French Academy of Sciences by M. Gosselin. The cure consists in decomposing the tumid swelling of the limbs, known as elephantiasis, by means of electrolysis, but at the same time the general health of the patient is also treated hydropathically, that is to say, by the cold water cure, sea baths, tincture of iodine, iodide of iron, arsenic, and other tonics. These medicines are intended to renovate the constitution, but are not of themselves sufficient to reduce the tumors. Electropathy, however, applied as soon as possible after the first manifestation, checks, and ultimately cures it. The cure is generally perfect, and takes place at the end of a few days in some cases; but if the elephantiasis is of long standing the cure is also a long process, and must be accompanied by proper medicines. The electrolysis is effected both by continuous and interrupted currents sent through the tumid swelling.

THE MULLEIN PLANT.—A good deal has been written lately about the mullein plant and its efficiency as a cure for consumption. Extracts and decoctions of this plant (*Verbascum thapsus*) were recently exhibited at the Cork Exhibition, but the judges would not pass any verdict, as the chemical and physiological properties have not yet been investigated. It is under the synonym of cow's lungwort, popularly looked upon as a value in diseases of the respiratory organs. In reference to the use of the above, Dr. Quinlan, of Dublin, writes to the *British Medical Journal* that three ounces of the green leaves should be boiled for ten minutes in a pint of new milk. The liquid is then strained, sweetened to taste, and drunk while warm. This dose can be repeated twice or three times a day. This high authority has no doubt of its efficacy as a curative in the earlier, and a palliative in the later stages of pulmonary consumption. Care should be taken to use the leaves of the great mullein, known by its thick, mucilaginous, and woolly leaves.

CANADIAN INDIAN MEDICINES.—The Marquis of Lorne, in his lecture at the Society of Arts on "Canada and its products" speaks of some of the cures effected by Canadian Indian squaws and medicine men. Although many of their medicines are known to medical men, and in spite of the *heros poems*, or incantations, practiced in their application, he believes that there are many herbs which would well repay the examination, and possibly lead to the discovery of valuable remedies.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

POTOSI.—Amador Ledger, May 13: This quartz mine located between Drytown and Plymouth, was taken in hand about nine months ago by a company of nine workmen, who obtained the consent of the owners to work it on their own account, and make what they could out of it, with the understanding, however, that if they should strike anything big, the owners should have the right to immediately resume possession by paying the miners regular wages for the time they had spent on it. After prospecting for seven months, in running a tunnel into the side hill in a northerly direction, a ledge from 12 to 15 ft wide was encountered. The ten-stamp mill was at once started on about six ft of the ledge lying next to the footwall. The entire ledge, it is believed will pay, but the mill is too small to crush the whole of it. They have cleaned up three times, the yield averaging from \$3 to \$3.50 per ton. As the rock is easily extracted, and no hoisting required, the men realize big wages, averaging \$120 per month. It takes 50 inches of water from Purinton's ditch to run the mill.

MISCELLANEOUS.—At the Loyal Lead claim, owned by John Palmer and others, the cleanup last month yielded between \$3,000 and \$4,000—the best run yet made. At the Seaton, they are hoisting water, but not extracting rock. The repairing of the old shaft of the Governor has been finished to the water level. Another rich streak of quartz has been struck in the St. Julian by drifting from the upraise in a northerly direction. The seam is an inch or two wide, but seems to be plentifully charged with gold. The one-stamp mill is running steadily, and a new concentrator, never before tested, is being put in. A cleanup was made at the Iowa mill in Sutter creek, consisting of 20 tons of rich ore from the Iowa mine. The yield was very satisfactory, running up into the hundreds per ton. It took the owners three months to get out this quantity of ore, but it paid them handsomely for their labor.

PLYMOUTH.—Cor. Amador Dispatch, May 8: The mills of the Con. Plymouth Mining Company are kept running and are making their usual output of bullion. The War Eagle claim, one mile west of Plymouth, is being opened by Messrs. Perry, Gordon and Lamb, and is promising exceedingly well. The new claim near Huse bridge is progressing as fast as possible under the circumstances; hoisting apparatus will have to be constructed before they can sink much deeper, and I understand the manager, Mr. Ballard, is now in San Francisco for the purpose of shipping up the necessary machinery. The Tom George claim, two miles north of Plymouth, is showing very rich ore. Mr. George has been on this mine for many years, and while he makes a living by pounding the ore in the mortar, it is a mere hand to mouth business, and Mr. George, in my judgment, is a very foolish man not to let some man or company of men open it up for an interest, or sell it for a reasonable price to some one who could open it up and make it one of the best mines on the Mother Lode. He has ore that will average \$50 per ton.

VOLCANO NEWS.—The mining business is rather slack at present. The Downs mine is not in operation and will not be until R. C. Downs gets back from the Springs. There is strong talk of the Acme mine starting up in a few days; also the Tellurium mine at Pine Grove. Gillick & Phillips are getting very rich rock out of their mine. The Tunnel Co. are working day and night cleaning up the debris caused by the last storm. Bob. Powers is at work in Mohala Flat and is getting very good pay.

Alpine.

WORK COMMENCED.—Monitor Argus, May 10: Work was begun this week on the Polaris mine, owned by T. N. Hanson and R. D. Hawkins, and situated in Mogul mining district. Very rich ore has been struck in this mine, and this summer the owners intend to develop its resources.

Calaveras.

QUARTZ MINES.—Cor. Stockton Independent, May 4: Quartz mining in Calaveras and Tuolumne counties may be said to be only on the threshold of development. In the vicinity of West Point, 15 miles east of Mokelumne Hill, there is a good deal of capital invested in quartz mining, and several mills are in successful operation. A 20-stamp mill is being erected on the Richardson mine, and the Scorpion is stamping out a good deal of precious metal. The Champion is a valuable mine, in which operations are at present temporarily suspended. Preparations are being made to erect on the Tunnel Ridge Hydraulic mine, near Mokelumne Hill, a five-stamp gravel mill. The material in which the gold is found is a sort of cement-gravel requiring stamps to free the metal. In the southern part of Calaveras the prospect is equally encouraging. Extensive gravel mines are being opened up in the immediate vicinity of San Andreas. New mining locations have recently been made in French gulch, Indian creek, Rich gulch, Chili gulch, and likewise a number in the neighborhood of Angels. The Gold Cliff mine in the latter district is regarded with much favor. It is located upon what is known as the "Mother Vein." There are several valuable mines in the vicinity of Angels, the section where James G. Fair operated before he went to Virginia City and became interested in the bonanza silver mines. At Dogtown, Murphys, Douglas Flat, Vallecito and Carson Hill mining is carried on with varying success, and in some of these localities gold-bearing quartz is abundant and rich. As improved appliances for extracting the precious metal from the rock are brought into use, greater confidence in the permanent success of mining pursuits is entertained.

MURPHYS.—Cor. Calaveras Citizen, May 10: Henry P. McNevin was in town last week. The shaft of the Washington mine, of which he is Supt., is now down 213 ft. It is the intention to crosscut for the lode from that depth. A distance of about 75 ft will have to be run before the vein is reached, when it is the opinion of many that a rich body of ore will be disclosed. The shaft is said to be a model of beauty and equal in its substantial timbering to any in this or any other mining region. The Oro Plata five-stamp mill is kept steadily running day

and night, with flattering results. The new tunnel is fast reaching the ore body. The Calaveras which has been stopped for a short time on account of the difficulty of getting wood for the engine, will start up again immediately with renewed energy since the advent of fair weather.

ARASTRA.—Mountain Echo, May 10: The new arastra mill in course of construction on the North End mine, situated about one mile west of this town, and owned by Smyth & Co., will be completed and ready for operation some time this week. John Willey, of Fourth Crossing, lately informed us that he had recently completed an arastra mill, and that he was steadily engaged in crushing ore from his mine which will yield \$40 per ton.

El Dorado.

COSUMNES.—Cor. Mountain Democrat, May 10: Our quiet little camp is beginning to look more cheerful, and we are looking forward to more prosperous times than we have enjoyed for many years. Our mining interests are certainly encouraging, and from the present outlook we may reasonably expect that in the near future we shall hear the rattle of stamps as well as the sound of whistles from quartz mills and hoisting machinery. Mr. Edner is vigorously working his gravel claim, which he has owned for 25 years, and has been working for five years with most favorable results, it having produced many thousands of dollars, and he has rich ground to work for many years to come. Mr. Ball is working his claim one mile west of this place, and is taking out gold to his satisfaction. His claim is worked by drifting part of the season and washing up when water is plenty. There are many other claims in this vicinity and at Indian Diggings that are being worked successfully, but the most important interest of the district is its numerous quartz veins. The Crystal mines, two miles north, has been worked successfully for many years, and Mr. Alexander, the Supt., is running a tunnel to strike the ledge at greater depth, where there is known to be rich ore. Mr. McClellan is opening up the Independence mine with bright prospects. This mine was worked many years ago, and produced a great deal of gold, but for want of proper appliances for saving gold and sulphurets work was suspended, and it has been lying idle for 15 years, but I am glad to know it is now showing some very rich ore. The Whiterock is a parallel vein with the Crystal and Independence and though little developed shows rich ore on the surface and only needs opening up to show a rich mine, and one most favorably situated for water power for mill and hoisting. This, with proper development, will prove to be a mine of great wealth. The Jackson is looking well, and its owners are contemplating the erection of a mill at an early date. An important operation is contemplated to immediately form a consolidation of three mines on the Grizzly Flat ridge—one owned by Mr. Edner of this place, one by Mr. Hanson of New York, and one known as the Middle Fork claim. The consolidation will start a double track tunnel, commencing on the ledge where it crosses the middle fork of the Cosumnes river and run south. This tunnel will be nine hundred ft below the croppings of the ledge on top of the hill, so that when they are in to the center of the hill they will have nine hundred ft of quartz above them. This tunnel will also tap the Missouri, St. Louis, Hazlewood, and other claims on the same ledge. They intend putting in Burleigh drills and driving the tunnel as rapidly as possible, and will commence as soon as they can perfect their organization. At the mouth of the tunnel is a splendid mill site with ample water power for all purposes. The Mount Pleasant is making its usual output of bullion, and is no doubt one of the best mines on the coast.

Mono.

STANDARD CON.—Bodie Free Press, May 8: There has been no perceptible decrease in the flow of surface water, but it is confidently expected that the present warm weather will create a change for the better. South drift No. 1 from south winze No. 2, 385 level, has advanced 20 ft during the week and shows two ft of milling ore. North drift No. 3 from main west crosscut, 385 level, is in 144 ft; progress 18 ft with the vein three ft wide. South drift No. 1 from east crosscut No. 3 has been driven 13 ft; total length 80 ft, where the vein is about two ft wide. Upraise from south drift No. 1, 500 level, has reached a height of 29 ft, where the vein is two and one half ft wide.

BODIE CON.—Bodie Free Press, May 12: Upraise No. 1, 300 level, has reached a height of 190 ft, a gain of 10 ft during the past week. At the top there is about two ft of ledge of low grade. Upraise No. 4 is up 47 ft, a gain of 15 ft, where there is no improvement. Upraise from 770 (Lent) level, has gained 11 ft; total height 48 ft. Here there is a ledge from 2 to 3 ft wide which shows spots of very good ore. At the Bodie Con. mill there was crushed 140 tons of ore. The average assay of the pulp was \$49.52, and of the tailings \$5.89. The most of this ore has been taken from the Vulcan vein, which is not looking so well. The ore is rather low grade. The shipments hereafter will be lighter than heretofore.

STANDARD CON.—Twelve miners were employed in the mine during the week ending May 10th. The flow or surface water has decreased considerably since last report. South drift No. 1 from south winze No. 2, 385 level, has been drained 18 ft. The vein is one and one-half ft wide, of milling ore. South drift No. 3, from main west crosscut, is in 128 ft; progress 14 ft, showing the vein three ft wide. South drift No. 4, from east crosscut No. 2, has been extended 12 ft; total length 92 ft; vein two ft wide. Upraise from south drift No. 1, 500 level, has reached a height of 36 ft, showing the vein two ft wide.

BULWER CON.—Three men were employed during the week. South drift from west crosscut No. 2, 500 level, is in 328 ft; progress 11 ft. The vein is about 15 inches wide.

SYNDICATE.—The mill is running steadily on a good grade of ore.

Nevada.

THE COE MINE.—Nevada Transcript, May 11: E. Hothersall has purchased Mr. Coe's interest in the Coe quartz mine on Little Deer creek, and now he and Messrs. M. L. and D. Marsh own the entire property. They have bought the hoisting and pumping machinery heretofore on the Wide West mine and also some hydraulic pipe from the Sherman Con. Co., and their works will be run by water power.

THE BALTIC MINE.—Nevada Transcript, May 8:

John McBean was down from the Baltic mine yesterday. He says the snow is from two to five ft deep right around the mine, and that until it melts off and the roads get in passable condition he will not try to start the machinery, but will simply get everything in order for doing so when the proper time comes. It will be several weeks before much can be done.

UNDERCURRENTS CARRIED AWAY.—A cave recently occurred at the Wah Yen mine near Moore's Flat filling up the company's shaft and doing other damage. A set of undercurrents in a canyon between Moore's and Orleans Flat, and owned by Messrs. W. D. Long of this city and Wm. Andrews, were carried away by the sliding debris.

MAGENTA MINE.—Grass Valley Union, May 9: The experience of the past Winter, with a rainfall up to the average, has shown the Magenta Mining Company that their pumping machinery is too light to handle the water in the lower levels, and therefore it has been determined to put in a 13-inch engine, which will be put in place as soon as possible. A new hoisting engine will also be put up. These changes will require a suspension of work at the mine from three to four weeks. In the meantime the drain tunnel will be driven to a connection with the main shaft, which will take the flow of surface water, which has been considerable, and will cause a lessening of the water and make it more easily handled by the pumps. On account of the heavy flow of water no work has been done during the winter on the 400 level, but the water has been held at the 300 level, on which and the stopes above work has been carried on continuously. In the drift and stopes of this level there is showing a ledge of good ore from 10 to 18 inches in size, carrying well in good sulphurets and also some free gold, and the general appearance of the mine has never been better. A good lot of rock is accumulating on the dump, and 22 carloads were raised during yesterday. None of the rock will be hauled to the custom mills hereafter, for the reason that arrangements for the erection of an eight-stamp mill are about completed.

Plumas.

A MILL.—Greenville Bulletin, May 7: At a meeting of the Directors of the Lucky S. mine, held on Saturday, it was resolved to put up a mill with as little delay as possible. Men are now at work improving the road for the hauling of machinery. The route selected is over what is known as the old Taylorville grade. From the tunnel in the mine the pay chimney has been opened 218 feet; it extends without change yet, and how much farther is not known. An upraise has also been put through, the depth of which is 95 feet. The ore is of uniform character from top to bottom. Distant 60 feet from the first ledge is another of about equal size and similar character. A crosscut will reach this ledge in a few days. It is expected that both ledges will be found to unite deeper in the mountain. In the face of the tunnel at present the first ledge is two and a half feet wide. The character of the ground and the appearance of the ledges give the strongest indications of permanence. The most experienced mining men who have examined the mine and prospected the ore, are confident that it will mill \$15 per ton. The owners will be well satisfied with much less.

BUTT VALLEY.—Mining is now quite brisk at Butt valley and Dutch Hill. At the former place Caleb Brown is taking out an ounce per day to the man by ground sluicing. The surface of the ground had been worked over once, but Mr. Brown is now working down to the bedrock. In the progress of the work a large ledge of quartz was uncovered; Mr. Brown started a tunnel in the bottom of the ravine and ran about 500 ft where he cut the ledge at right angles. He then ran a drift along the ledge 80 ft. The walls are well defined, and the ledge 18 ft wide where it has been cut through. The ore contains a great deal of red and black sulphurets; it is soft and would be easy to work. At a greater depth the ledge will probably be found harder. No quartz mining has been done at Butt valley. This claim might develop into a valuable property. The rock prospects high.

AT DUTCH HILL the Savercool brothers have a number of men at work, and have leased a great deal of the ground to others, who are all doing well. The brothers have men at work on a tunnel to reach a quartz ledge higher up on the ridge. A great deal of money has been taken out here and at Butt valley, and all below these ledges now found at both places. The prospect is now decidedly favorable for the development of valuable quartz mines in that neighborhood. The Southern Eureka mill starts up to-morrow on ore belonging to McMillan and McDonald. This ore is taken out of a claim adjoining the Southern Eureka ground, and will be milled as a prospect. It is expected to yield a fair return and there is plenty of it.

CONSIGNEE.—Plumas National, May 10: Charley Hanson was in town this week, and tells us that mining matters are booming along up in the Long valley section. The Consigne Company are driving their tunnel ahead slowly but surely, and will get into the right channel after a while. They have spent a large sum of money in prospecting the claim, and deserve to be rewarded with a rich mine. John Jackson is doing lots of work this year, and will make his mine pay rich dividends. Tefft & Co. are going for it, with good chances for a fine season's pay. Several smaller operations are showing some activity, and it is to be hoped that from the many prospects, a number of good mines will result, and a lively camp will show up in that section.

LA PORTE.—Our mines are now running, which gives employment to the idle men and makes the town more quiet, if possible, than usual. It is said that Col. Plum and other distinguished capitalists from Illinois, are to pay us a visit this summer. Col. and Mrs. Plum are to be the guests of Mr. and Mrs. Lillie, while here. Col. Plum is the head of a company that is spending a good deal of money in this vicinity in opening mines. Mr. James Lillie acting as agent, and a good selection did the company make too. Few Eastern companies have been as fortunate in the choice of managers to disburse their funds in this State.

NORTH FORK.—Winter seems to be about gone, and the miners along the river are waking up. The boys at Cariboo are all busy. Jones, Garanson & Co. are piping with a good head of water on Drummond's Point. Big Frank has returned from the States and gone to work running more tunnel than any other man in the State. Emmons and Ware have suspended operations for the present, owing to

high water. Uncle Dave Kirkham is preparing for his annual attack on his river claim. The Savercool Bros. are operating the Dutch Hill mine. They have about 17 men at work, and will have the water through the big ditch in about two weeks. The boys have been prospecting the last two years for quartz at Dutch hill, and it looks now as though they would come to the front with a big mine before long. H. Thompson (Commodore) has discovered and located what he believes to be a valuable mine, on the head of Mosquito creek, and in the same range as the famous Hallsted mine. It is rumored that Baptiste Piazzonia a few days ago refused \$22,000 for his quartz mine, situated near Dutch Hill. Col. R. G. Lansing, President of the Feather River G. M. Co., is on his way from New York, and is expected in a few days at the Savercool mine. He comes for the purpose of starting up the mine. The mine and forty-stamp mill has been idle the past two years for some reason, but will soon be one of the lively camps of the county.

Placer.

FOREST HILL.—Placer Herald, May 10: Every few days heavy machinery is brought through town, intended for the new Washington Mining Co.'s mill. One wheel passed through a few days ago which weighed 8,800 pounds, and this week a large drum weighing 2,100 pounds came in; but the largest wheel is expected shortly to arrive—it will weigh six tons. The whole machinery and buildings of this Company are of a solid and substantial character. The Mayflower Co. are still sinking deeper. Their prospects are looking better. This company deserves great credit for the pluck and energy with which they have prosecuted their works so far. That they may meet with great success, is the earnest wish of all.

San Bernardino.

MINES NEAR OLD WOMEN SPRINGS.—Calico Print, May 11: Messrs. Fossie & Fley own some fine prospects about eight miles north of Old Woman's Springs and about 28 miles south of Newberry station. They recently sold a half interest in one of them, called the Greenhorn, to Mr. Embody, a wealthy capitalist of Los Angeles. Adjoining the Greenhorn is the Blue Jacket claim belonging to Messrs. Fossie & Fley. It is the intention of these gentlemen to co-operate with Mr. Embody to run a combination tunnel through the Greenhorn and Blue Jacket. They have each hired four men to commence work immediately. Mr. Embody and party passed through Daggett last Sunday enroute by rail to Newberry, from whence they would proceed to the above mines by teams. Last Sunday Mr. R. H. Lewis, who has been engaged in mining for a number of years in Nevada county, and at Virginia City and recently employed at the Alford mine, called at our office, and from him we gathered the following information in regard to some mines near Old Woman Springs. He stated that for the last four months he has been prospecting in the vicinity of those springs, and has endured considerable hardships in his efforts to discover mineral bearing ledges. During the stormy weather his prospecting operations were impeded by the snow that fell to a depth of two or three ft several times. His explorations in the locality about eight miles north of Old Woman Springs resulted in the finding of six ledges bearing mineral. Three claims were given the following names by Mr. Lewis: Oasis, May Flower, Eleanor, Maggie, Desert, Prince and Nil Desperandum, all of which have been duly recorded. These claims are about eight miles east of Ord. The Oasis has a 25-foot ledge, samples of ore from the same assaying \$121 in silver and 45 per cent copper. The croppings of the ledge stand up 15 or 20 ft above the surface, and several cuts have been made across it to ascertain character of the rock and the extent of the ledge matter. Mr. Lewis is making arrangements with other parties to have a shaft sunk 150 ft on one of his claims. He considers that he has some good property there, and intends to sell a portion of it in order to get money to develop the remainder. He stated the survey of the Atlantic and Pacific railroad runs within a half a mile of his claims, and that the company has entered into negotiations with Messrs. Fossie & Fley, owners of the Old Woman's Springs to obtain from the springs all the water they may require.

CALICO DISTRICT.—Print, May 10: Messrs. Wm. Robinson, Ed. Lec and John Boge, have leased the west end of the Taggart mine and Messrs. F. M., W. S., and John W. Neel have leased the east end of the mine for six months. The first parties have commenced work and are taking out ore. The second parties are putting up a house and are going to work in a few days. There is a small force of men at work on the Cuba No. 1, the mine recently purchased by Governor Daggett & Co. A boarding and lodging house is being put up for the miners and when it is completed a larger force will be put on. There are five or six men working on the Comet, sinking a shaft and running a tunnel. They are taking out some good ore and will soon take a quantity to the mill. There are four or five men at work on the Thunder, sinking a shaft and taking out good looking ore. There is one man at work on the O. K. Mine. Some three or four tons of ore from this mine were recently milled, yielding about \$150 to the ton. Several different parties have leased the Occidental and are chloriding in various places with encouraging results. Mr. A. Barber has six or seven men employed on the Red Jacket running in a tunnel, who are taking out some fine looking ore. The development of the mine is progressing in excellent shape under the immediate direction of Mr. Robt. Dougherty, the foreman. Mr. Barber has also leased the Veto in Oriental canyon and will soon set a force of men to work on the same.

Sierra.

GOOD CLEAN-UP.—Mountain Messenger, May 10: Jerome York cleaned up his arastra last Wednesday after a 48 days' run, realizing \$800. He estimates that he crushed 72 tons, which would make the yield per ton a trifle over \$11. The quartz crushed was all taken from a raise about fifteen ft long, the ledge being from three to seven ft wide. Everything between the walls was crushed, no selection of rock being made. He is working along towards a stamp mill, having the timbers for the same pretty much all out, and the iron-work all ready to be taken to the mine. This is proving itself what we have often asserted it to be, one of the most promising quartz ledges in this section. The Sierra Buttles Co.'s flume, near No. 7 tunnel, gave way a few days ago. Damages have been repaired. E. J. Jones, of St. Louis, has contracted to run a

hard rock tunnel, 400 ft in length, for the Lincoln Mining Co., Potosi. Wider plates are being used at the Colombo that, it is believed, will save most if not all the gold. A three-compartment shaft at the Marguerite quartz mine will be put down soon as the mine is drained.

Tuolumne.

STARTED UP.—*Union Democrat*, May 8: The mill at the Golden Gate mine has again started up, and the daily song of its stamps is a cheerful greeting to residents of town, whose earnest desire is for a continuance, and that Mr. Wetmore will soon have the mine and mill running in full blast as in days of yore. At present himself and son are crushing rock they had on the surface.

Trinity.

ENCOURAGING WORK.—*Trinity Journal*, Mr. T. J. Blakemore, of Eastman district, was in town this week and from him we learn that the Blakemores are running two arrastras, and that the rock crushed, pays well and regularly. In the mine they are sinking a shaft from the level on which they have been working, and are running a tunnel in another direction, and both give every indication of extent and permanence. At the end of the tunnel the ledge is 2½ ft in width, and prospects well.

PLENTY OF WATER.—The warm days and nights of the past week have had a marked effect in increasing the supply of water for hydraulic purposes, and miners in Weaver Basin, as well as elsewhere in the county, are making good use of all they have. There is yet a fair depth of snow in the high mountains, and water can be depended upon to keep up much later than last season, which is equivalent to guaranteeing an increased gold production for the current year. Trinity county gravel mines pay regularly and the yield can always be closely estimated by the quantity of gravel washed during a season, and this only limited by the amount of rainfall and resulting water supply.

MAKING GRAVEL FLY.—The mine on Oregon Gulch mountain is being vigorously worked this season; they have six hours water per day for sluicing at the present, and Supt. Lovridge is using it for all it is worth. About twenty-five men are employed in the mine, and good results are confidently anticipated.

PAYING WELL.—We learn that Fred Haas' hydraulic mine at Junction City is yielding splendidly this season. A clean-up of the first ten boxes, after a three weeks' run, yielded about \$7,400 last week, and several partial clean-ups have been made with like encouraging results.

BOIT'S HILL.—We learn that John Yule is doing splendid work in the Buckeye Company's mine at this point, and that prospects are encouraging. The water supply is good now and indications favorable for a long continuance.

NEVADA.

Washoe District.

BEST AND BELCHER.—*Enterprise*, May 10: The west crosscut on the 1200 level was extended a total distance of 125 ft, when work was stopped, for the present, and an east crosscut started just opposite that going west. The east crosscut is now out between 30 and 40 ft, and is passing through a promising formation. A second east crosscut has been started on the line of the Best and Belcher and Con. Virginia, which is out a distance of 15 to 20 ft. On the 2700 level the north drift is out about 82 ft, and is in material that assays \$2 or \$3 a ton.

GOULD AND CURRY.—Work has not yet been resumed in the southeast drift on the 2700 level. It will be remembered that when this drift was out from the joint Best and Belcher station a distance of 25 ft signs of water were seen and the diamond drill was put in. When the drill was out some 40 ft a body of quartz was encountered; also, a flow of hot water of considerable volume. This water is now being allowed to drain out.

UTAH.—Work in the north drift on the 1950 level has been discontinued, and a drift started south on the same level. This south drift is out 45 ft. The face is in porphyry, with seams of clay and some streaks of quartz.

SAVAGE.—Are clearing out the north drift on the 2600 level preparatory to putting in the bulkhead. The work is about completed, and the drain boxes have been carried nearly to the face of the drift where the water comes in.

MEXICAN.—The winze on the 3100 level has been sunk and timbered 10 ft during the week. Its total depth is 53 ft, leaving 47 ft to go to reach the 3200 level. There is no change of formation as yet.

SIERRA NEVADA.—Are pushing forward the northeast drift on the 3100 level. A drill hole is here ahead a distance of 170 ft. It shows the ground to be nearly dry. The face of the drift is at present in vein porphyry.

ALTA.—The diamond drill is still being run west from the face of the main west drift on the 2150 level. The rock is exceedingly hard. Meantime both drifts on the 2150 level are being repaired.

UNION CON.—The only work doing on the 3100 is in west crosscut No. 3, which is out 15 ft. It still continues in vein porphyry. The east crosscuts on this level are slowly draining out.

ANDRES.—Some paying ore continues to be extracted, and the prospecting drifts encounter a good deal of quartz of a promising character.

COMBINATION SHAFT.—Are now sinking below the 2800 level. At a proper depth the Cornish pump will be moved down the distance of another lift.

OPHIR.—Some low grade ore from the fillings of the old drifts on the 250 level, and some prospecting is being done.

CROWN POINT.—The usual amount of ore is being extracted, and the mills on the Carson river are kept busily running to their full capacity.

IMPERIAL.—All going on about as usual in the old upper levels. Some very fair quartz has been found at several points.

YELLOW JACKET.—The old upper levels continue to yield well in the usual character of ore, keeping the river mills at work.

Belmont District.

BELMONT.—*Courier*, May 10: Since last report have made good progress in drift on 200-foot level

south. The ledge in face of drift averages three ft in width, well defined and producing fine chloride and black metal ore. Also progressing well with stopes Nos. 3 and 4. As far as the ledge has been tested, it looks very promising. Will commence repairs on mill in a few days.

Columbus District.

MOUNT DIABLO.—*True Fissure*, May 10: There are no very important developments to record during the past week. The east intermediate from winze No. 5 is now in 21 ft, and the west drift is in 15 ft. Winze No. 6 is now down 77 ft. The south crosscut in the intermediate, between the second and third levels, has reached a length of 96 ft. In the same intermediate, and nearly above winze No. 5, a north crosscut has been driven 33 ft, and the west drift has been advanced 7 ft. It is showing a little ore in the face. The west drift on the first level has been stopped, and a crosscut started north from the end of the same. The incline is now 120 ft below the third level, having been sunk 16 ft during the week.

COLUMBUS CON.—The principal part of the work is now being done on the 150-foot and third levels. A west drift on the 150-foot level continues in ore which assays from \$60 to \$80 per ton. This crosscut is about 35 ft in length, and has been running through this strata of ore for the last 10 ft. The raise from the south crosscut, on the same level, continues in very hard rock, and the progress is slow. It continues to yield some ore from which good average assays are obtained. The work of cleaning out the drifts on the second and third levels is nearly completed. All the ore which is extracted is being stowed away in the mine.

THE TILDEN.—The work of putting the new ladders in the shaft has been completed and the machinery has been put in motion. Everything is now ready to commence prospecting. It has been determined to begin cutting out a station at a point just above the water level, from which the work of development will soon be started.

Eureka District.

LOCAL NOTES.—*Eureka Sentinel*, May 8: Charles McLane is prospecting for ore in one of his mines in the Hamburg belt. The Marguerite mine, Adams Hill, is again looking well and producing considerable ore. Prospectors are taking to the hills, and it will not be long before the camp will be looking prosperous again. Evans & Co. are taking out some nice ore from the Tiger Lily and Little Giant mines, on Coy Hill, which they have leased. The Paul Fry mine, Adams Hill, is looking splendidly, but is the only one out of several in that locality that is making a reputation. Parties leasing the General Lee mine, Adams Hill, shipped some ore to the furnaces last week, and are now getting out another batch. The Home Ticket grade has again been shoveled out, and ten tons of ore were shipped from the mine to the Richmond furnaces yesterday. The lessees of the Reserve and King Lear mines, Adams Hill, have 50 tons of first and second-class ore, and 20 tons of flux ore on the dump ready for shipment. Maurice Hartnett has struck a good thing in the Industry mine, near the line of the Piute. He has driven a drift from the bottom of a shaft in the direction named, and run it five ft into a body of good ore with neither sides, top nor bottom, so far as he has gone. Messrs. Doolin, McMann and Crowley are still at work on their pitch in the Helen Mortimer mine, one of the properties of the Hamburg Company. They have considerable ore on their dump awaiting shipment to the furnaces. This cannot be made until the road up New York canyon is cleared of the snow, which, however, is fast disappearing. For several years past lessees have cajoled the mine, but the parties who now have it under lease have started to work systematically and are in a position to take out ore without having to pack it through a labyrinth of holes. The mine is opened by a tunnel, and from this Messrs. Doolin & Co. have sunk a winze to connect with the ore body. The ore was traced through a series of windings until the present deposit was found. It is on a well-defined fissure, running northwest and southeast, and dipping at an angle of about 80 degrees. The ore averages about five ft between the walls. In one place it has been sunk on to a depth of 32 ft and it has been stowed out for a length of 75 ft. It was reported last week that the ore had nearly pinched. This was true, but it has since then opened out again and looks better than ever.

Esmeralda District.

THE HUMBOLDT MILL.—*Bodie Free Press*, May 10: Governor Blasdel is at Aurora, making arrangements to start the Humboldt mill on Silver Lining ore. McKinlay & Co. have finished their contract on the mine, and have made such a good showing that the Governor has concluded to push things vigorously. It will take but a slight start to make the old camp boom.

Star District.

THE GRIZZLY MINE.—*Silver State*, May 9: J. Phillips and J. C. Harris, two experienced miners, left yesterday for Star district. They are going to work with William Woolcock on the Grizzly mine, which is said to be looking splendidly, and which has produced considerable ore in the last year that worked about \$1,000 to the ton.

Taylor District.

LOOKING WELL.—*Cor. White Pine News*, May 3: Our mines continue to look well and are yielding the usual quantities of ore. The Monitor Company started up their mill on the 25th, and she promises to be a good paying institution for a long time to come. The Argus mines are improving in appearance. The new strike I spoke of in my last proves a very important one. Mr. Underhill likes the appearance of the new find so much that he has put on 8-hour shifts, and intends to prove to the world that Taylor veins go down, and that his company will turn out bullion enough the coming summer to pay for the mill and all expenses.

White Pine District.

ORES.—*Cor. White Pine News*, May 3: Transportation between here and Eberhardt is being carried on solely by man-power in front of sleds. D. B. Clark, the leaching process adept, is to visit us soon again and make further examination of our ores. Messrs. Rockhill and Sterrett are at work upon a renewed contract on the Jennie A and Black Rock mines. The Hon. came in yesterday and reported his experience of the trip as the roughest he had ever made to the alpine summit of White Pine.

ARIZONA.

GALENA.—*Arizona Miner*, May 10: A big strike of a large body of low-grade galena ore has just been made in the Buzzard and Raven, one of the Dosoris group of mines. The ore averages about \$125 to the ton. Colonel Greenwell, who has just returned from the Hassayampa, reports the Dunkirk mine, in that district, as rapidly developing into a very valuable property. The Lawrence mine, Agua Fria district, is destined to some day prove one of the best paying properties in Arizona. During the last winter, Jack Lawler, its owner, has sunk a depth of forty ft, and taken out forty tons of sulphide of copper ore, which goes as high as \$500 in silver. Had Turkey Creek the good fortune to fall into the hands of such men as Fair and Mackey, Northern Arizona would witness a boom that would rival the palmist days of the Comstock. The latest strike reported in the district is a three-foot body of \$300 ore on the first extension of the Pine Spring mine, being the property of Messrs. Powell and Ross. The Pine Spring itself, is said to have never looked better. Native and horn silver rock taken from its 70-foot level goes over \$2,000 to the ton, and plenty of it in sight.

COLORADO.

CLEAR CREEK CO.—In lode No. 6 in the Diamond tunnel, the lessees have, during the past week, encountered a six-inch streak of high-grade ore. Superintendent Fish informs us that work will soon be resumed on the old Maine-Phoenix property. This is one of the best mines in Clear Creek county, and has, in past years, yielded enormous amounts of rich ore. Messrs. Goss & Co. have encountered a fine body of copper and galena ore in the cross-cut run from the main drift of the Crown Prince lode to cut the Colorado State. They will shortly test their ore by mill-run. Mr. A. E. Bonham, the owner of the Boyd lode, East Argentine district, informs the *Miner* that work, which for some time has been suspended on the lode on account of the snow, will be resumed on Monday next. A large force of miners will be put to work and the property extensively developed. There are some 300 sacks of ore now at the mine awaiting shipment. Very encouraging are the reports that come to us from the Baltimore tunnel property. Messrs. Samuel Peterson & Co., who are drifting west from the old Baltimore shaft, have a flattering prospect, and are industriously pushing their drift ahead for the purpose of intersecting the large ore body known to exist. Coster & Co., leasing east of the shaft, have six inches of solid ore. The crevice measures from three to four ft between walls. The ore taken from here mills as follows: First class, 800 ounces; second class, 400 to 500 ounces; third class, 250 ounces silver per ton. It carries gray copper, ruby, galena and zinc. Pope & Co. have leased the ground just west of Peterson's, and are drifting and stoping vigorously. They have five inches of A No. 1 ore. Still farther west, and above this ground, lessees are taking out big pay. The first-class ore ranges from 200 to 300 ounces silver per ton. The famous Terrible is putting out some rich mineral. The Silver Ore shaft is now between 700 and 800 ft in depth. In the drift easterly from the bottom of the shaft is disclosed from 4 to 6 inches of 250 ounce mineral, carrying fine-grained galena, gray copper and some ruby silver. The main shaft is still sinking and has now about reached the distance at which drifting easterly will at once begin. This level will be continued for the purpose of intersecting the large ore body known to exist ahead. It ranges from 8 to 18 inches in width, and mills from 300 to 400 ounces silver per ton.

ANOTHER MILL AT EMPIRE.—Mr. J. B. Terry has leased the Bay State mill at Empire, and will soon have it in readiness to treat custom ores. A new sill has been placed under the batteries, and the mill will no doubt do good work. Mr. Terry thinks he will have the mill running by the tenth of May.

SILVER CREEK MINES.—Mining affairs, in this now famous camp, are taking a "boom" as the work of development progresses. The Moore, Farris & Co. lease on No. 1 lode, Jo Reynolds property, is producing some excellent mineral. The sinking of the shaft goes steadily on, and as depth is gained the quantity and quality of the ore grows better. Last week a fine streak of ruby silver was encountered in the bottom of this shaft. The handsome sum of \$8,565 was taken from this shaft in twenty-seven days. In the lease of Messrs. Lewis & Co. on the Jo Reynolds property, 1,000 ounce ore has been disclosed. The lessees throughout the mine are taking out good pay.

IDAHO.

QUARTZ PROSPECTS. *Cœur d'Alene Eagle*.—As the work of development progresses the quartz interests of the camp assume greater and more prominent and permanent proportions. The Cœur d'Alene country is a network of quartz lodes—a veritable mineral farm. Each day the tireless prospectors bring to light the precious mineral ribs with which nature has seamed this mighty mountain range. On the mother lode no additional prospecting has been done owing to the volume of water in the creek. New timbers have been put in, and as the water subsides, further excavations will be made to uncover the lode and to test its width and depth. It still continues the great attraction of the camp, and its marvellous richness is a standard topic of conversation. The Kate Burnett is developed by a tunnel which taps the ledge at a depth of eighty ft from the surface, exposing a breast of high-grade, free gold bearing quartz, with every indication favorable for the continuation of the lode in strength and depth. The Montana is a lode located near the Kate Burnett, and prospects well in free gold as far as developments have progressed. The New Comstock is regarded by experts as the biggest lode in the camp. Since our last issue an incline has been started to cut through the vein to test its width to the footwall. A cross-cut has been run along the length of the lode, demonstrating that the ledge is as wide, strong and rich at the depth attained as on the surface. Several hundred tons of ore are now in sight, and the ledge is so admirably located for working that one man took out eight tons alone last Monday. The mine is being developed under the auspices of the Homestake Mining company, organized by Jas. McKenzie, the discoverer. The Skookum was discovered last year by J. C. Friend. Later, Messrs. Coy & Hess purchased a half interest, and McClaire, Wade & Co., the Colfax bankers, a fourth interest in the mine. Coy & Hess sold a one-

sixteenth interest April 25 to J. M. Elder for \$1,000, and on Wednesday of this week they transferred a three-sixteenth interest to Sid Benton and others for \$3,000. A portion of the lode traverses Sitton creek. The Skookum is generally regarded as one of the most valuable mining properties in the camp.

DREAM GULCH.—Dream Gulch is still the banner dust producer of the camp. The clean up on Wednesday of last week netted 52½ oz., and last Saturday after a two days run with the new hydraulic, the clean up produced over \$1900. Nine men are employed on the day shift and nine on the night shift. After the first clean up it was predicted by the croakers that the gulch would be "spotted," but the results do not realize the prediction. The owners are now developing the ledge which was uncovered two weeks since, and good gold prospects are obtained from the quartz as far as prospected. Thursday's clean up was sixty ounces. Water has failed so the boys have to stop hydraulic, but they are bound to have water at any cost and commenced to-day the survey for a ditch, and expect to have it completed and a good head of water running in ten days.

MONTANA.

THE LEXINGTON MILL.—*Inter-Mountain*, May 12: It is said that on account of the scarcity of free ore in the Lexington the old mill will soon be closed down, as the tailings will not pay to work separately. The mill is an old land mark, having been built in 1877. It has worked some of the richest rock ever produced in the district, and has turned out over \$2,000,000 in bullion. It cost \$14,770 so—just a dollar and six-bits less than estimated by Judge Dav's before he built it. This shows the Judge to be a close figurer. The structure will probably be leased for custom work, as there is plenty of available free ore in the district.

THE MOULTON.—From Supt. J. K. Clark, this morning, it is learned that in the 300 ft west of the drift of the Moulton, early this week, a ten-inch streak of ore assaying \$360 per ton was struck. This exceedingly rich rock greatly enhances the average ore product of the drift, and as the new strike seems to be enlarging westward, Mr. Clark is quite hopeful that it will ultimately in a very important development. If it does not, there will be no disappointment, as the vein in the 300 is rich and extensive as it is. On the 500 level work continues actively in the face of the west drift where, at a distance of 650 ft from the main crosscut, the winze from the 400 level is expected to connect in a few days. The Moulton produced over \$50,000 during April, the battery assays for the month averaging \$60. The company works 100 men.

NEW MEXICO.

SAN DIEGO DISTRICT.—*Cor. Rio Grande Republican*, May 12: Very few of your readers, I think, have ever heard of a mining district of the above name, and indeed it is a very young camp yet, consisting only of myself and partner; but we think we know a good thing when we see it, and we should not camp here unless we had a prospect that was at least as good as any it is probable we should find in the Organs or Lake Valley. Our camp is at the foot of San Diego mountain, about two miles from Truett station, south of Rincon, on the A. T. & S. F. railroad. We have about seven claims, on two of which, the Clipper and the Norton, work is progressing. The mineral is galena and black sulphurets, and a very fair character of ore. There is plenty of ground for prospecting, and all new-comers will get a hearty welcome.

OREGON.

LOCAL NOTES.—*Jacksonville Times*, May 12: Klippel & Keaton of Poorman's creek, are getting ready to clean up. McKee Bros., who are mining on Forest creek, picked up a \$250 piece last week. Huston & Hosmer of Footh Creek have cleaned up, and considering the opportunity, have done fairly. H. D. Russell of Forest creek has been able to do considerable work during the season with his reservoir. Drifting is going on at A. W. Sturges' claim on Jackass creek, with good results. Several men are employed there. Simmons, Ennis & Co's mining ditch near Waldo, which is a young canal, by the way, is already over four miles long and has several feet of water in it. Two pipes are in full blast at the Sterling mine, and Supt. Ennis expects to have a good supply of water until the end of July, as there is a great deal of snow at the head of the ditch. A. L. Roten returned from the Cœur d'Alene mines last week. He says there is no reason for this great excitement, which seems to have been gotten up in the interest of speculators. Snow is still on the ground and no work of consequence being done. Mr. R. says he did not see \$2.50 worth of gold dust while in the camp.

UTAH.

SOUTHERN NOTES.—*Southern Utah Times*, May 10: In local mining matters there is not much of interest to report. Work progresses as usual upon the old reliable Horn Silver mine, regular shipments have been resumed. The Company has declared its regular quarterly dividend of three per cent, or \$300,000, payable May 15th. The new hoisting works in course of erection upon the H. S. property are being pushed forward. The Lulu or First South Extension H. S. M. Co.'s works are in working order and the shaft is being widened to the dimensions of a double compartment. A force of 15 men is employed in the Rattler mine belonging to the Frisco M. & S. Co. and a 75 foot shaft contract has been let during the week to Messrs. Melville & Short, who will make short work of getting the shaft to a connection point with the winze that has been put down all the way in solid galena ore. Upon the whole the Carbonate outlook is now a very favorable one and Supt. Kirby seems justified in indulging high hopes for the Carbonate Camp. It is said on what the Beaver County Record considers good authority that the iron furnaces will not be erected at Iron City as previously contemplated; but at the more convenient location of Iron Springs. The movement will necessitate the total abandonment of quite a large amount of costly labor laid out at the first named location; but on the other hand the manifest practical advantages to be gained by the prospective change of site, will it is claimed, more than compensate for the loss.

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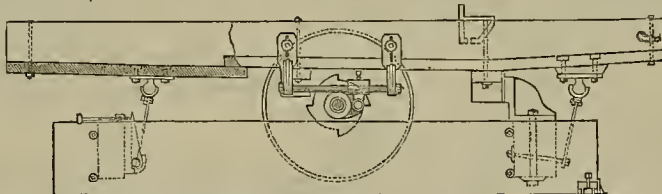
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Ingersoll, D2 3", beat Rand 3 1/2".....	.744 " "
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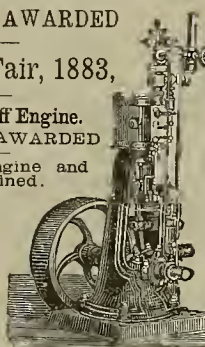
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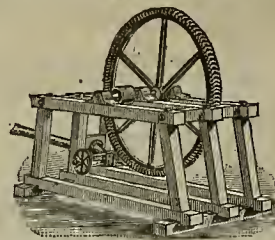
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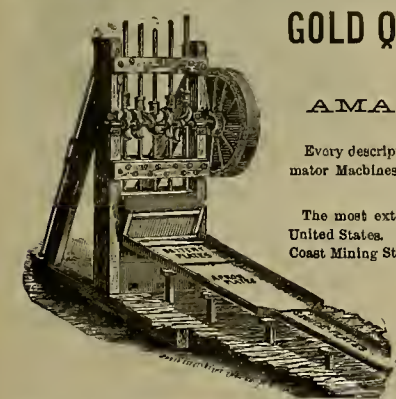
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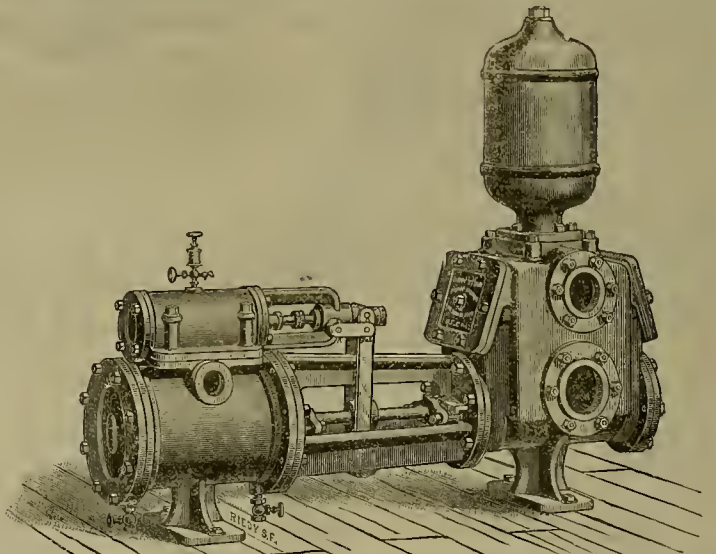
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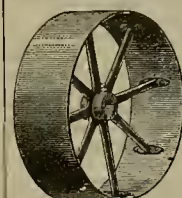
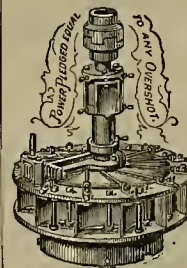
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Yours truly, P. VEASEY,
31 California St., S. F.

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Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR—In reply to your inquiry concerning the working of your Centrifugal Roller Quartz Mill, I am pleased to say that I run one of them for seven months, doing custom work on different varieties of rock, and that the mill gave satisfaction in every respect, and did all that you claim for it.

Yours truly, BYRON JENNINGS.

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F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—In reply to your inquiry concerning the working of the five feet Centrifugal Roller Quartz Mill, bought of you for the Garibaldi mine in Calaveras county, I take pleasure in saying it gives entire satisfaction in every respect, and I only regret that the mine does not warrant the purchase of more of them and the continued use of the one now in operation.

Very truly yours, O. B. SMITH.

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Very truly yours, D. O. MOWRY.

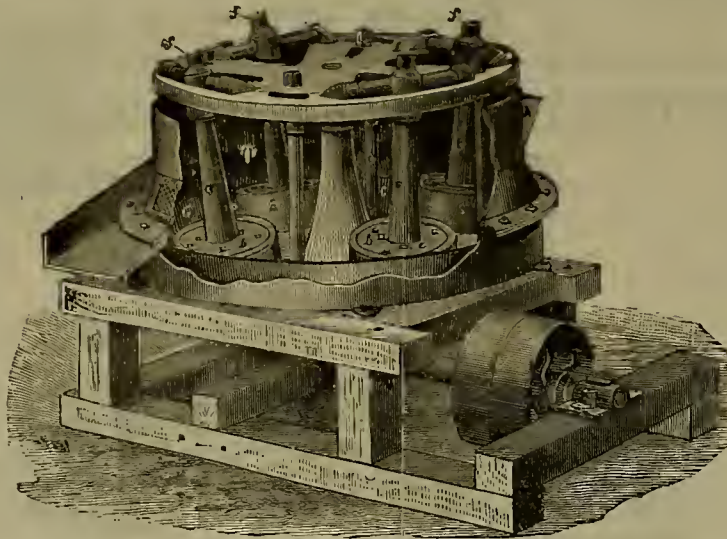
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DEAR SIR—In reply to yours of recent date, inquiring about the Centrifugal Mill which I bought of you, I will say that I have run the mill four months on hard rock; and I take pleasure in adding that the mill has in every way given the best of satisfaction.

Yours truly, J. H. NEALE.

GARIBALDI MINE,
Calaveras Co., Cal., Dec. 17, 1883. |

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—In answer to your inquiry concerning the working of the five feet Centrifugal Mill, bought of you for the Garibaldi mine in Calaveras county, I take pleasure in saying it gives entire satisfaction in every respect, and I only regret that the mine does not warrant the purchase of more of them and the continued use of the one now in operation.

Very truly yours, O. B. SMITH.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR—Your Centrifugal Roller Quartz Mill has run on the Whidden Gold Mining Co. property at Shingle Springs, El Dorado Co., Cal., about four months, and it has done good and satisfactory work, a greater proportion of gold remaining in the mill than in the stamp battery.

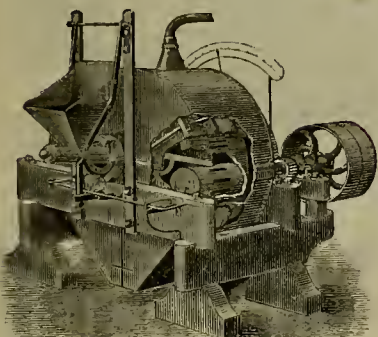
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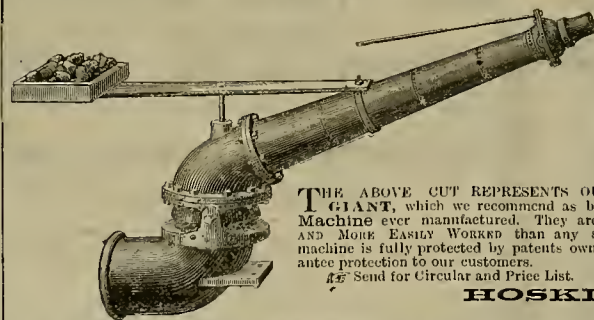


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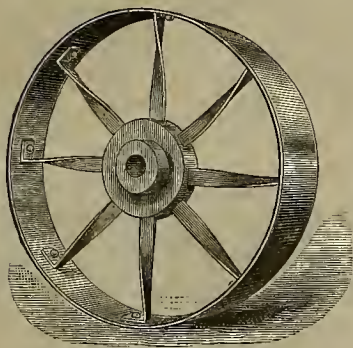
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All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

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Steam Engines, Flour Mill,
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This COKE is exclusively used by Prof. Thomas Price, in his assay office, by the Selby Smelting and Lead Co., Prescott, Scott & Co., Risdon Iron and Locomotive Works and others in this city. Large supplies are regularly forwarded to consumers in Salt Lake and Nevada, to the Copper Queen Mining Co., Longfellow Copper Mining Co. and other consumers in Arizona.

The undersigned are in receipt of regular supplies from Cardiff, Wales, and offer the COKE for sale in quantities to suit purchasers.

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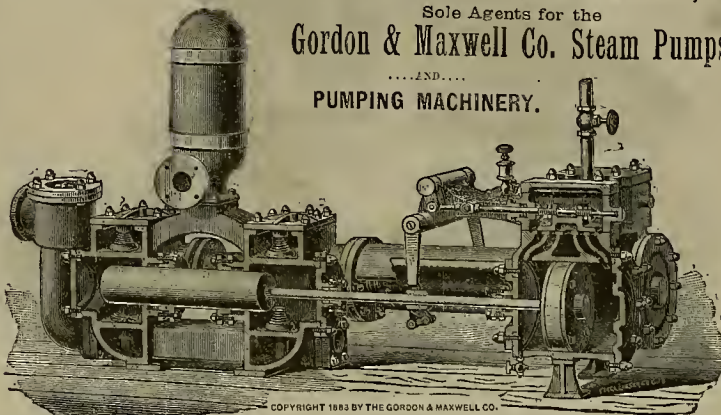
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Sole Agents for the

Gordon & Maxwell Co. Steam Pumps

PUMPING MACHINERY.



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HEINE PATENT SAFETY BOILER,
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Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

TESTIMONIALS.

ST. LOUIS, Mo., Sept. 23, 1883

Messrs. Adolphus Meier & Co. GENTLEMEN: We cheerfully certify that the "Heine Patent Safety Boiler" put up by you in our establishment has proved very satisfactory in its work. The chief points of excellence in the "Heine Safety Boiler" are its economy in fuel and space, freedom from scaling, aptitude for power and heating purposes, working equally well with clear and muddy water. We warmly recommend it to all using steam machinery. Yours truly,

ANHEUSER-BUSCH BREWING ASS'N.

OFFICE OF Supt. of RYAL RAILWAYS,
BERLIN, Sept. 23, 1883.

To Mr. H. Heine, Civil Engineer: In reply to your inquiry of September 24, we respectfully inform you that the three boilers built under your patents under steam since September 25, 1881, at the Alexander Platz Depot, as well as the two at Friedrich Strasse Depot, under steam since September 22, 1882, have given good satisfaction, requiring no repairs whatsoever to date. The internal cleaning of the boiler was always accomplished

with ease on account of the convenient arrangement of the tube caps, the adhesion of scales being fully prevented thereby, and the boilers kept in prime condition.

(Signed) BRAUCKE.

Send for Circular and Prices.

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C. L. FOUTS, SECRETARY

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Manufacturers and Repairers of all Kinds of

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NO VALVES! NO PISTON!
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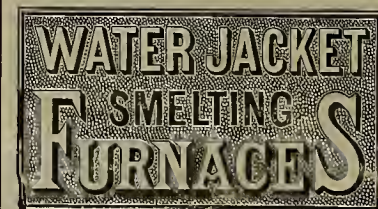
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Galena Silver & Copper Ores.

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No other furnaces can compare with these for durability and in capacity for uninterrupted work.

MORE THAN ONE HUNDRED of them are now running on the Pacific Coast, giving results never before obtained as regards continuous running, economy of fuel, grade and quality of bullion produced. We are prepared to demonstrate by facts the claims here made.

These Smelters are shipped in a complete state, requiring no brick or stone work, except that for the crucible, thus saving great expense and loss of time in construction.

Complete smelting plants made to order of any capacity and with all the improvements that experience has suggested as valuable in this class of machinery. Skilled and experienced smelters furnished when desired to superintend construction and running of furnaces. Estimates given upon application. Send for circular.

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NATIONAL COMPRESSORS and ROCK DRILLS.

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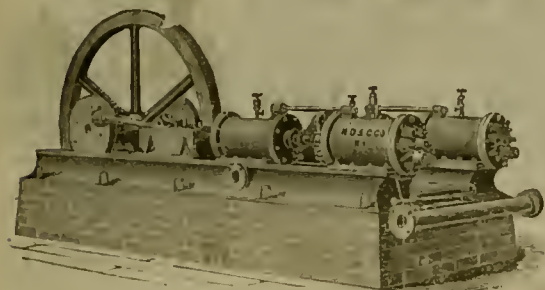
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CALL AND SEE IT OR SEND FOR CIRCULARS.



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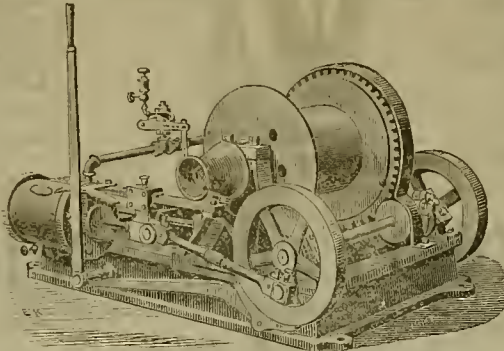
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The Korting's Injector is the simplest, cheapest and best in use. Will draft its own water, hot or cold, and feed under varying pressure. Send for Circular.

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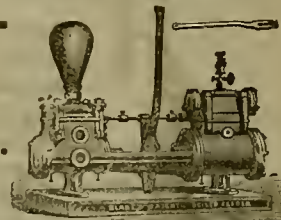
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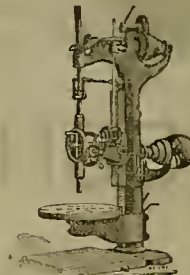
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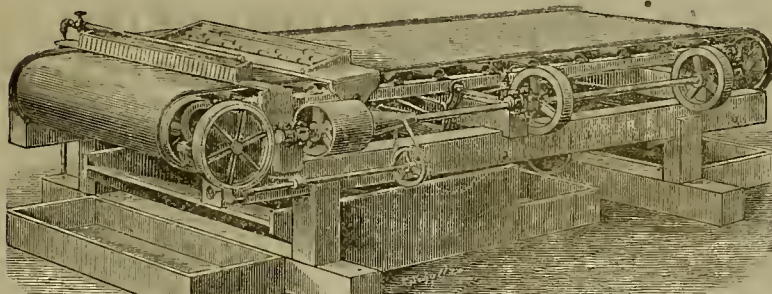
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OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the office of Hinckley, Spiers & Hayes, No. 220 Fremont Street, San Francisco.

To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company. That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements. That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

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Room 7—No. 109 California Street,
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H. T. SCOTT, Vice-Pres't and Treas.

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TRY OUR MAKE. CHEAPEST AND BEST IN USE.

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Successors to PRESCOTT, SCOTT & CO.

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Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over all other Valves and Gate Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases
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3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrounding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid in position, see that Valves are stamped "Jenkins Bros." For sale by

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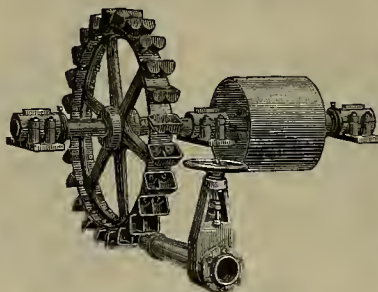
**Mining Machinery, Steam Pumps, Wood and Iron Working Machinery,
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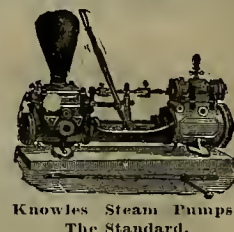
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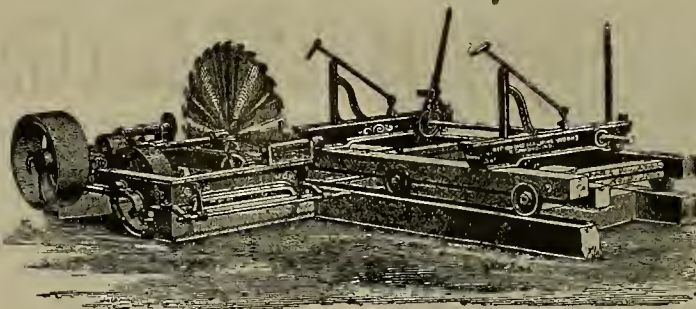
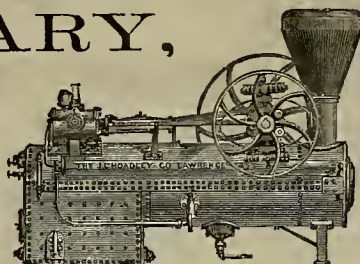
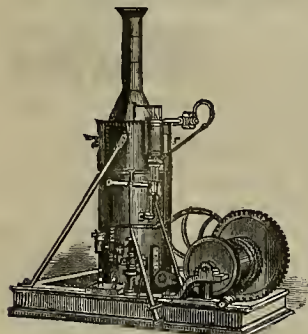
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**NEW AND SECOND HAND BOILERS, ENGINES AND MACHINERY
OF EVERY VARIETY.****Steam Pumps of all Makes,**

CENTRIFUGAL PUMPS,

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Band Saws,**Stickers,****Planers,****Shapers,****Etc., Etc.****MINING, QUARTZ, AND SAWMILL MACHINERY.****AUTOMATIC ORE-FEEDERS, HENDY AND TRIUMPH CONCENTRATORS.**

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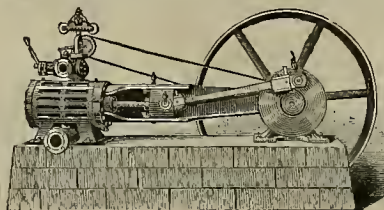
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Importers and Dealers in all kinds of

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**PIG IRON, ENGLISH FOUNDRY COKE, CUMBERLAND & LEHIGH COAL
SPECIALTIES.****STEARNS MANUFACTURING CO.,**

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Heavy Automatic and Slide-valve Engines,

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Skinner & Wood Portable Engines and Boilers,

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MAY 24, 1884.

VOLUME XLVIII
Number 21.

The Hydraulic Mines.

It is not by any means the case, as many suppose, that all the hydraulic mines in California are closed down. A number of them are at work at points where there is dumping ground where the tailings do not incommode others or where the debris does not go into the main rivers. Some hydraulic miners have purchased large tracts of land on to which they lead and deposit their debris, the water then passing off into the streams. Again, other mines of small importance have not been enjoined, but are continuing work. Engineers Allardt and Basset have made a report to the Supervisors of Yuba and Sutter counties concerning the mines of the Bear river basin. They state in their report that there are thirteen different mines at work using the hydraulic process on the opposite sides of the river in Placer and Nevada counties, and enumerate them as follows: Polar Star, Elmore Hill, Rahlin Bros., Bailey Bros. & Davis and Wm Gray, at Dutch Flat; McCloud, Turner Bros. and Linderman, near Quaker Hill; Liberty Hill, at Liberty Hill; Birdseye Co., two claims, near Red Dog; Nevada Company, at Chalk Bluff; and Jacobs Bros., at Quaker Hill. From the best information obtainable these mines are using 3,400 inches of water each 24 hours, and are tailing into Bear river and its tributaries 12,900 cubic yards of debris per day. The mines of Dutch Flat and vicinity, including the mines of Liberty Hill, are working in much heavier material than at the other places, but it is advised that they, as well as the rest be enjoined. In view of the fact, however, that an injunction would work a great hardship upon individual miners, who depend upon the working of their claims for the support of themselves and families, it is recommended that no injunction be applied for that shall operate before the 15th of June, as "considering the enormous quantity of debris that has been discharged into Bear river during the last fifteen or twenty years, the damage that would result would be, comparatively speaking, quite inconsiderable." The report says in conclusion that the construction of restraining dams was brought to their notice, the miners contending that they could be made effectual and built at a moderate cost in the mountain divisions of the river, but the engineers were only authorized to say that as long as hydraulic mining continued the question of dams could not be entertained; but if hydraulic mining was discontinued, then, the said engineers would be the first to lend their support to remedial measures, provided it be first demonstrated that such measures would be absolutely efficient and permanent for all time to come. Messrs. Allardt and Basset testify to the uniform courtesy which was extended to them by the miners, although the latter were fully apprized of the unwelcome nature of their, the engineers, mission.

Four miners, James Lawrence, Coleman Chapelle, Robert Wallace and Joseph Hays were buried in a mine at Forest Springs, about four miles from Grass Valley, Saturday morning. Their bodies were recovered.

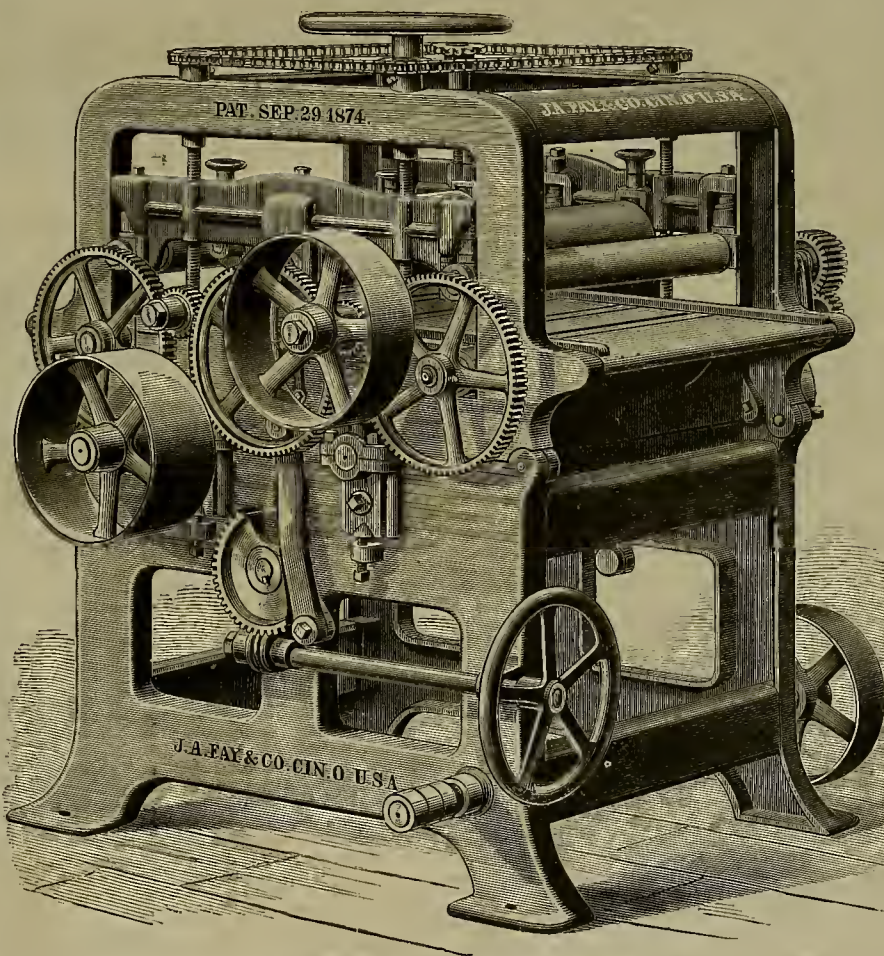
A Sand-Papering Machine.

The engraving on this page illustrates the J. A. Fay & Co.'s No. 3, large, six-roll, double-drum sand-papering machine, with expansive feed rolls and vibrating cylinder. This machine is designed to finish lumber to a perfect surface, for painting and varnishing, and is specially adapted for use in furniture and cabinet shops, agricultural implement, wagon and carriage works, car shops, etc. It is a very substantial machine, and its marked improvements give it great prominence among sand papering ma-

the last drum. The finishing drum is placed so that the discharging rollers carry the lumber from it, thus running through and finishing one board, if desired, without another following.

The roughing drum carries a coarse grade of sand paper, and the finishing drum a finer grade. They may be driven in opposite or the same directions as may be necessary.

The lower frame is hinged at each end to the upper frame, so that by removing a pin either drum can be reached by raising the frame with the screw and worm gear, operated by a hand wheel at the end of the machine. The machine



DOUBLE DRUM SAND-PAPERING MACHINE.

chines. It is arranged to work material twenty-four inches wide by four inches thick and under; has a powerful and continuous feed, and it gives to the lumber a perfect surface by once passing it through the machine.

The feeding mechanism consists of six rollers, in three pairs, driven by a strong train of gearing. The upper feeding rollers, with the pressure rollers over the drum, are lifted together in a perfect plane by the movement of four raising screws, operated by a chain and hand wheel. The lower feeding rollers always remain in perfect line with the drums.

It is supplied with two sand paper drums placed in the body of the machine on which the upper frame rests. The drum at the receiving end of the machine has a vibratory lateral motion for removing lines made by irregularities in the sand paper and preparing the surface of the material for a perfect finish after passing

is supplied with a countershaft having 12x6 tight and loose pulleys, which should make 675 revolutions per minute. H. P. Gregory & Co., of this city, are agents for the Pacific coast.

The last council in the Indian Territory passed or amended the mineral law so that a citizen of the nation can associate with non-citizens in the Cherokee Nation; so there is no barrier now in the way to prevent capitalists investing their money in mining operations in the Indian Territory.

Union miners are leaving Tombstone rapidly. Owners of mines refuse to pay more than \$3 per day and will not employ union men at that rate.

The Russian Government, it is said, has decided upon a large issue of gold coin. Ingots of specie have been issued from abroad,

Curiosities of Ore Shipment.

It seems somewhat curious that people think that ore can be worked better somewhere else than at home. Miners ship ore long distances, paying freights, in the hope of getting higher returns than at the works in the camps where the mines are. Ore is shipped from Mexico, Arizona and elsewhere to California to be worked, and it is also shipped abroad from this State. They have been shipping ore from Calico, San Bernardino county, to Pueblo, Colorado, and now comes one of the owners of the Benson Smelting Works, Arizona, and proposes to have them ship ores to those works for beneficiation. He is going to have a permanent agent in the camp to buy ore to ship it there. Ore comes here from Nevada and is also sent from here. There are big works in Montana, but great quantities of ore are shipped from there to Europe. Idaho and Montana send ore to Utah. Arizona and Mexico send it to California and Colorado. Idaho also sends it to Nebraska. A curious instance of this cross-shipment of ore is that which shows that during the month of April the Denver and Rio Grande Railroad Company carried sixty-one cars of ore, aggregating 1,230,000 pounds, from Utah to Colorado to be smelted. During the same time the road brought sixty-five car loads of Colorado ore, 1,270,000 pounds, for reduction at smelters in Utah. Both Colorado and Utah have earned a reputation for the success of their smelting works, and thousands of tons are now worked there which are mined in other regions. Baltimore, Maryland, works considerable copper ore from this coast. New Jersey and New York do some work on ores mined on this coast, and Chicago will probably do a good deal of this work in the future. The Selby works, in this city, have for many years been engaged in smelting lead and manufacturing a commercial article. The Melrose works, down the bay, have been intermittently carried on. It seems strange that capitalists here have not long since established extensive works somewhere on the shore of San Francisco Bay for the treatment of various kinds of ores. As it is there is no place here where ores can be worked in large quantities by different processes. In this respect San Francisco, and in fact, California, is much behind the times.

THE SAVAGE BULKHEAD.—Work on the bulkhead which is being placed in the north drift on the 2600 level of the Savage is making good progress. It is thought it will be completed in two weeks. The stone are all cut on the surface, fitted into a model representing the bulkhead, and then each block is marked with a number. These blocks will be placed in the bulkhead below just as they were laid in the model on the surface. The bulkhead will have in it a waste-cock through which the water will flow until the mason work is completed, when it will be closed. Below this waste-cock, down near the floor of the drift, will be placed a pressure gauge, like the pressure gauges used on steam boilers, by means of which the exact pressure on the bulkhead can at all times be observed with perfect accuracy.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

A New Nickel Salt.

EDITORS PRESS:—The ordinary nickel zanthate is at first yellow, becoming reddish quickly, and when dried on the water-bath is almost red. It is very soluble in ammonia without heating. In the course of my experiments I have twice accidentally produced from the yellow zanthate, a compound of a beautiful green color, quite different from the green of cobalt zanthate. It is insoluble in cold concentrated ammonia, but is decomposed by boiling in that. On drying with gentle heat, it assumes the color and properties of the yellow zanthate. I believe it is a hydrated zanthate. The conditions under which this new compound is produced are as yet not certainly known to me. It was obtained during the re-solution in dilute ammonia of dried yellow zanthate.

C. H. AARON.

Berea Grit.

The Berea sandstone, Berea grit, Amherst stone, or Ohio stone, as it is variously called, is a characteristic member of the sub-carboniferous rocks of Ohio, found about 300 feet below the Coal Measure rocks, with its outcrop extending from the Ohio river northward through the central part of the State into Huron county, and passing thence easterly, in an undulating line, to near the northeast corner of Trumbull county.

It is ordinarily a rather fine-grained sandstone, with a sharp grit, but differing greatly in its character in different localities. Amherst has furnished from it the best building stone, Berea the best grindstones, but other localities in the region described are capable of furnishing equally good material for both of these uses.

In places the rock is massive, in others it is in regular layers, of a thickness varying from several feet to a few inches. Much of the latter is evenly bedded, making an excellent flagging stone. In some of the quarries, especially in Huron county, these thin strata furnish the finest examples of ripple-marking to be found in the State.

Its exposure in Summit county is confined to the valley of the Cuyahoga river and the bluff bordering it. It appears at the bottom of the valley near the south line of Borton township, and from thence rises in the bluffs to the north line of the county. It is in this county a hard, evenly-bedded, compact rock, varying in color from nearly white to a dark brown, but in places so irregularly colored as to detract somewhat from its value as a building stone.

The quarry most extensively worked is a little south of the village of Peninsula, in Borton township. The upper part has been removed by glacial action, leaving about 40 feet undisturbed, which can be quarried with a slight stripping of earth, while the product is carried by a gravity road to the canal and railroad below.

Some years ago a diligent search was made in the State for a stone especially fitted for the construction of a safe vault, and after thorough tests the white rock from this quarry was selected as the best that could be found. The preference was given to it on account of its strength and bardness, and because of the facility with which blocks of any required size could be obtained. It is largely used for buildings, for abutments of bridges, and other similar purposes. But there is a special use to which it has been applied which is worthy of mention.

Mr. Fred. Shumacher, of Akron, is the founder of the oatmeal industry in this country, and has also been extensively engaged in the work of pearling barley. He found considerable difficulty in obtaining millstones suitable for his work, and after protracted tests of all available material, selected the white variety of this Peninsula stone as the best that he could find. Its great hardness and very sharp grit especially fitted it for this use. A layer, the bottom of which was 3 or 4 feet above the underlying shale, proved to be the best, that which is of strictly first class quality having been yet found only in this quarry. He has used for this purpose about 250 blocks, ranging in diameter from 4 to 5 feet, and in thickness from 14 to 18 inches, and has sold to others about 30 such blocks. These blocks he values at from \$1 to \$2 per cubic foot. In his mills at Akron he is now using 28 runs of these stones, and producing 80,000 barrels of oatmeal and 50,000 barrels of pearl barley per annum. The stones used for pearling barley are placed upright in iron shells revolving slowly in a direction opposite to that of the stone. Mr. Shumacher is now putting the machinery into a new mill, which will increase the annual production of oatmeal to 240,000 barrels, of the value of \$1,500,000.

The success of this industry is largely the result of the peculiar character of a small part of the stone from this quarry. The work was commenced in 1856, and has steadily increased until the present time. Its dependence upon the character of this rock, in the estimation of Mr. Shumacher, is indicated by the fact that he has purchased the entire quarry and is now putting it in shape for a large production of building stone, expecting, as this is removed, to uncover and make available a full supply of that which is especially fitted for milling purposes.

The Extraction of Sulphur.*

Sulphur is found either in superficial deposits, the result of volcanic emanations, constituting the solfatara, or else at a considerable depth underground, associated with calcareous and bituminous marls, gypsum, celestite, etc., forming the sulphur mines, which are the most important sources of this material.

The principal mines are in Sicily and in continental Italy.

The ore is got out with picks, and is transported from the mines on the backs of men. Its extraction is effected by the partial combustion of the sulphur. This causes heat enough to fuse the remaining portion, which then flows into a hollow in the ground, from which it is collected. In Sicily the sulphur is treated in a kiln termed the *calcaroni*. It consists of a wall inclosing an inclined circular area, on which the ore is placed. The heap is covered with a layer of spent material thick enough to keep the combustion from proceeding too rapidly, and spaces are left here and there for the insertion of fagots of wood. The *calcaroni* ready, the fagots are lighted, and the access of air so regulated as to avoid active combustion and too high a temperature. After the operation has been in progress a certain length of time, the operatives begin collecting the sulphur, and continue it until the ore is exhausted. In this operation considerable quantities of sulphur dioxide are produced, and in consequence of the difficulty of regulating the draft, much sulphur is wasted. (Great damage is caused to the surrounding country, and any cultivation of the ground within a certain radius of the burning places is prevented. So great is this nuisance that the Government of Italy forbids "burning the ore," between the 1st of July and the 31st of December.

The *calcaroni* yield but 50 per cent (at most 60 per cent) of the sulphur contained in the ore, the rest serving as the fuel, and thus producing torrents of sulphide dioxide. The imperfections of this process have for a long time given rise to numerous attempts to devise a more rational and less costly method of extracting the sulphur, by the employment of some other kind of fuel. Heated air, steam under pressure, superheated steam and carbon bisulphide to dissolve the sulphur, have in turn been proposed for the purpose of obtaining the greater part of the sulphur without the production of sulphurous acid fumes.

In the first of these methods, a chamber of masonry is filled with the ore, and a current of warm gas, from a hearth fed with wood or coal, is sent into it. This prevents in great measure the production of sulphurous acid, but the action is slow and the mass of ore is irregularly heated. A large amount of fuel is used and the number of hands is increased, so that the economy over the old method is very small.

The use of steam seemed at first sight to offer the best solution of the problem; for its action is very simple and rapid, and the sulphur obtained of good quality. The yield is better than in the *calcaroni* process, and no sulphur dioxide is produced.

But the advantages of this method are counterbalanced in great part by the extra expense of purchasing and maintaining the equipment, as well as furnishing the fuel. The apparatus necessary are the boilers for heating the water tanks to receive the ore, and other accessories. The water available for supplying the boilers is bad, rapidly forming crusts, which increase materially the cost of maintenance. Besides, the proportion of fuel used is considerable, in consequence of the large amount of steam necessary to heat the ore, as well as the loss of heat due to radiation from the uncovered surfaces of boilers, tanks, etc. This process can not be applied in all cases, for the increased yield will not compensate for the greater cost of operating.

The treatment by carbon bisulphide, though very rational *a priori*, presents inconveniences that make its use impracticable. This solvent volatilizes very rapidly, making it difficult and dangerous to work with, besides causing a considerable loss of material.

These difficulties have prevented the various processes from being used to any great extent, so that the old method of the *calcaroni* is the one still generally employed.

In 1805, Thomas proposed immersing the ore in salt solutions heated to a suitable temperature. Balard, in 1867, thought the water from the salt marshes, which is rich in magnesium chloride, might answer. And finally, in 1868, Laperais took out a patent in Italy for the extraction of sulphur by the immersion of its ores in a liquid heated 10 degrees or 20 degrees above its fusing point. By this means, it is separated from the earthy materials associated with it. He used a solution of calcium chloride. The apparatus consisted of a spherical boiler of 2,000-liters capacity, furnished with a stop-cock for drawing off the liquid sulphur, and surmounted by a vertical cylindrical part, into which, with the aid of a pulley, a basket of perforated iron, filled with the ore, can be let down upon a grate.

The apparatus is placed in a furnace and heated directly, while the cylindrical portion is surrounded by the warm gases passing up the chimney. The basket of ore is let down into the solution of chloride of calcium heated to 130 degrees. The sulphur melts, collects in the bottom of the boiler, and is drawn off by the stop-cock and poured into molds. When the ore is exhausted, the basket is raised and immediately immersed in water contained in another boiler

heated in the same furnace. This was used to supply the place of that lost by evaporation in the first.

At that time, chloride of calcium was comparatively dear, so that the patent could not be worked successfully, and was soon abandoned.

Very recently this process has been taken up by MM. de la Tour and Dubreuil, and put into practice by them with success.

Chloride of calcium is now very cheap, in consequence of the rapid development of the soda industry (the ammonia process). It can be put down at the sulphur mines in Sicily at 9 francs per 100 kilos.

The apparatus of MM. de la Tour and Dubreuil consists of two rectangular tanks, holding about two cubic meters each (2 m. by 1.30 m. by .75 m.). The bottom of the tanks is inclined one-tenth. They are placed in the same furnace and heated alternately by the same fire, which is fed with coke, lignite or coal. The ore is placed in one of these tanks, in which is also placed a solution of calcium chloride boiling at 120 degrees. Heat is then applied, the sulphur melts gradually, and is drawn off directly into molds by means of a spigot.

The whole operation lasts about two hours. The end is reached when the sulphur ceases to flow. The calcium chloride solution is then drawn off into the other tank previously charged with ore. Half of the liquid flows through a communicating tube; the rest is received in a vat built in the ground, and is raised by a pump. The gangue is washed to regain the salt which it has absorbed, and this dilute solution is used in filling the tanks as occasion demands. The heat is then directed upon the second tank, and the first is cleared and recharged. There is no interruption in the work, and the heat from the fire is all utilized. The sulphur obtained contains only .1 per cent or .2 per cent of impurity, whereas that obtained from the *calcaroni* contains from 2 per cent to 3 per cent. There is left in the gangue but 4 per cent or 5 per cent of the sulphur originally contained in the fresh ore.

In this treatment certain ores are completely disintegrated, in consequence of the fusion of the sulphur, which is then mixed with earthy matter. MM. de la Tour and Dubreuil, in order to overcome this great inconvenience, were compelled to change completely the plan of their apparatus. The new plan which they adopted is applicable to the treatment of ores of all kinds.

The tanks are built horizontal, and are divided longitudinally through the center by a gutter with inclined sides, which collects the sulphur, and from which it is drawn. On its two sides, iron gratings are built vertically to keep the ore from falling into it. These gratings are made of bars of sheet-iron 2 mm. thick and 25 mm. wide, placed 3 mm. apart. By this new arrangement they can treat ores of all kinds, even the fine powder formed in mining the ore. This powder is very rich, and is known in Sicily as *sterri*. It was formerly left at the mines. This *sterri* is always richer than the average of the mined ore; for in getting the ore out, the rock breaks and divides along the lines of least resistance, which in this case are the veins of sulphur. On account of its friability, the sulphur is reduced partially to dust and forms a large part of the mixture.

At the Tronica mine, in the province of Caltanissetta, in Sicily, the ordinary ore gives 21 per cent of sulphur when treated by the calcium chloride method, while the *sterro* yields 72 per cent. The average yield of the Sicily ore, treated in the *calcaroni*, is from 12 per cent to 13 per cent. In some few cases, it reaches 17 per cent.

On comparative treatment, the same ores yielded from 10 per cent to 12 per cent by the *calcaroni* process, and from 19 per cent to 23 per cent by fusion in chloride of calcium bath.

It has been known for a long time that ores very rich in sulphur acted badly in the *calcaroni*. The combustion is too rapid; and the sulphur, browned and viscous from overheating, is hard to draw off. In order to treat such ores, it is necessary to mix them first with inert material when the yield is not in accordance with the primitive richness of the ore. These rich ores are, on the contrary, treated advantageously in the chloride of calcium bath.

After the treatment of a large amount of *sterri*, MM. de la Tour and Dubreuil estimated the cost of extraction of a ton of sulphur at 12 francs 75c. in the case of a mean yield of 33 per cent of the weight of the ore.

The cost of treatment of one charge (about 1,000 kilos) in their apparatus, is as follows:

	Francs.	C.
35 kilos fuel (coal mixed with lignite) at 30 francs per ton.....	1	5
14 kilos chloride of calcium, 2 per cent carried away by gangue after washing, at 9 francs per 100 kilos.....	1	25
Labor.....	1	25
Unforeseen general expenses, 20 per cent.....	..	70
Total.....	4	25

Thus, in order to obtain a ton of sulphur, three charges must be worked, making the cost of extraction 12 francs 75 centimes per ton.

An operation with *sterri* requires an hour and a quarter for fusion, a quarter of an hour for drawing the sulphur, and an hour and a half for washing the gangue and letting it drain, clearing the tank and putting the movable gratings back in place.

MM. de la Tour and Dubreuil have already introduced a number of their tanks in the sulphur region, principally for working up the *sterri*. There are three at the Tronica mine, in the province of Caltanissetta; two at the Grottarossa mine, in the same province; two at Per-

nice, near Recalmuto, and two at the mine Crocca.

The method just considered presents great advantages over the older methods:

1st. It allows the extraction of the greater part of the sulphur from ores of every kind, at a minimum cost for fuel.

2d. The extraction is effected regularly, protected from atmospheric influences.

3d. Work is carried on throughout the year, as no sulphurous acid fumes are formed.

4th. It permits the treatment of the ores according to the demands of the trade.

The Glendive Gold Discovery.

J. T. Leads, a ranchman in the Red Water country, some sixty miles north of Glendive, Montana, has given the *Times* the following information concerning the new gold discoveries reported in that section a few days ago: "I met two men named Kelley and Collins, from Miles City prospecting down Red Water, on which they found color all the way. I accompanied them to Lone Tree Gulch, a branch of Red Water, which they prospected and found fair pay in every hole. They made ten prospect holes, in one of which at a depth of six feet they struck rock, in which gold was found in quantity. They would go no further, and covering the rock left for supplies, with the understanding that they would say nothing about it. In one pan from the grass roots I saw seven bright colors, three of which were good size, and the miners estimated it worth fifty cents to that pan. These prospect holes could not have been salted and I closely watched their movements, and neither of them had ever seen the gulch before. I am building a house, and in the meantime live in a tent pitched alongside of Adams' house. They slept with me and during my absence Mr. Adams heard them say: 'There's where we'll locate,' meaning the gulch, as they were talking about it at the time. They found some quartz specimens on the trip which looked good."

Lone Tree Gulch is a branch of the Redwater, about twelve miles long, well watered and fed by innumerable springs. It empties into the Red Water about twenty-five miles from its mouth. This is sixty miles from Glendive, which is the nearest point on the railroad.

Mechanics' Institute Fair.

At a meeting of the Board of Trustees of the Mechanics' Institute Fair, it was decided to open the exhibition on August 5th and close it on September 6th.

The following committees for the fair were appointed:

Auditing—C. Waterhouse, A. W. Starbird and B. Jackson.

Building—D. A. MacDonald, C. Hopps and A. W. Starbird.

Circulars and Classifications—B. Jackson, C. F. Bassett and J. Hendy.

Printing—George Spaulding, C. F. Bassett and W. P. Stout.

Power and Machinery—James Spear, J. Hendy and David Kerr.

Rules and Awards—A. Starbird, James Pendergast and G. Spaulding.

Tickets and Awards—W. P. Stout, David Kerr and C. F. Bassett.

Music and Decoration—J. A. Bauer, C. Hopps and A. W. Starbird.

Privileges—David Kerr, C. Hopps and A. W. Starbird.

Location and Police—J. Pendergast, C. Hopps and D. A. MacDonald.

Horticulture—C. Hopps, B. Jackson and G. Spaulding.

Gas and Water—J. A. Hendy, C. Waterhouse and J. Spear.

Special Exhibits—C. F. Bassett, W. P. Stout and Charles Hopps.

IDLE MEN IN THE NORTHWEST.—There are said to be more idle men now in this district, says the *Butte* (Montana) *Inter-Mountain*, than ever before despite the fact that more men are now employed than at any previous time. Hundreds of disappointed *Cueard* Alene stampedeers have come to Butte. Miners are coming from nearly every district in Colorado, Leadville and the camps in Gunnison, Clear Creek, Gilpin and other countries being now on the rapid decline. Mining companies all over the State are discharging men by the hundred. Utah mines are now working smaller forces than ever before, and outside of Alta, Frisco and Park only limited operations are conducted. Silver Reef is dead, Tintic and Dry Canyon ditto, and Bingham is dying. Utah has only two great mines, viz: The Ontario and Horn Silver. In Nevada mining is also at a low ebb, and as in Colorado and Utah the cause is to be found in the low price of lead. Eureka is no longer a hurrah camp, and all the other camps in the State are very dull. As a result of this general depression, miners are flocking to Montana, and particularly to Butte. They cannot all find employment here, and we fear there will be some distress unless the Utah, Colorado and Nevada booms are resurrected. It is said that one company in this district has a hundred applicants a day for work.

A GOOD DEAL of ore is being taken out in Safford district. The Onondago folks alone have shipped 2,500 tons of high-grade ore, and have on hand an immense amount of low-grade that will be worked at the new furnace.

* Translated from the *American Chemical Journal* from a paper by M. Camille Vincent in the *Bulletin de la Société Chimique*.

MECHANICAL PROGRESS.

Observations on Hardening.

Too many of the so-called steel articles sold in the market are either made from steel incapable of being hardened, or are not hardened at all. Good cast steel can be hardened and tempered so as to receive and retain an edge. This is not required of table cutlery generally—only of the carving knife—but it is required of the hand saw and the buck saw, of the spade and the manure fork, of the scissors and the pocket knife. Saw blades (so far as the writer has tried them) are not hardened; they will not retain "set" nor hold edge. They are gunned, as they come from the rolls and the slitting machine, with no pretense at hardening or tempering. But they are stumped "cast steel," and that probably satisfies the public; but there are mechanics who would pay something extra to get good hardened and tempered saw blades, even at a much higher cost than that of the soft plates, the teeth of which can be bent by thumb and finger, and the set of which is removed by sawing through an inch thick spruce board.

A spade is only an enlarged chisel; it should be capable of retaining an edge sufficient to cut through tough turf and deep grass. But most of the "cast steel" spades in the market can be sharpened as readily by drawing the edge cold under the hammer as by the grindstone. The edge never breaks, but batters and bends.

The trouble with almost all the cast steel tools put ready-made on the market is, that they have never been hardened. Cast steel unhardened is as soft as wrought iron uncase-hardened. A cast steel hammer becomes so indented on its face by driving nails during one season in jobbing that it had to be reground and polished. Yet the hammer was of steel capable of being hardened, as was proved by its being subsequently hardened and drawn to temper. It is quite possible that the reason why many of these articles prove to be soft is not that the material is not good, but that they have never been hardened. Brightened steel that has not received a hardening may respond in after heating to several of the tempering colors, and this is probably one reason why common steel articles are not thoroughly hardened.

It is not uncommon to see a forger or temperer heat a piece of cast steel to a very low red—a red that shows only in the shadow—and then brighten and draw the temper to color, when the after-trial proved that the steel had never been hardened. Indeed, the dull red that some smiths use for hardening such tools as cold chisels and other low grade tools is that at which a red annealing may take place—the piece being heated to a dull red and plunged into water.

The first requisite in making a cast steel tool into a working tool is to harden it. After its hardness is proved, then it may be tempered to the condition required. There is no intermediate process of properly tempering between absolute hardening and subsequent drawing.—*Scientific American.*

SHRINKAGE.—There is but very little material that keeps the same size under all circumstances, says E. H. Davies, in the *Architect and Building News*. Metals shrink and expand—some very much more than others—according to change of temperature. Like metals, different woods vary much in shrinkage. But all woods of the same variety will shrink in size, in proportion to the amount of water or sap contained in the wood. One variety of wood may contain four times the quantity of sap, and still not shrink near so much as others. Lumber sawed from trees growing on a hillside, or near the water, or on the south side of a grove, will shrink very irregularly. Some parts will shrink very much more than others, more particularly endways. The same is true with a tree that grows very much out of perpendicular. Suppose a tall tree was growing at an angle of forty-five degrees, the tree itself being perfectly straight, as soon as the tree was cut down it would partially assume the shape of a rainbow. Nearly all lumber shrinks more or less endways. Some lumber will shrink on one side and expand on the other as it is sawed. This is very noticeable in sawing lumber from logs. For instance, the first board sawed from a log may be longer than the log, or vice versa, according to which side the sawing was commenced. It is also very noticeable in ripping up lumber; sometimes when the saw gets well into the board, it begins to pinch, and has to be wedged, but after the saw gets nearly through the cut begins to open. It is doubtful if there is any lumber known that shrinks as much endways as redwood. That wood shrinks on an average one-fourth of an inch in twelve feet; but there are cases when it is four times that amount.

GALVANIZATION OF IRON MECHANICALLY AND MEDICALLY CONSIDERED.—One of the Philadelphia medical inspectors has directed his investigations to medical phenomena involved in the galvanization of iron. In this process, he says, the metal is first heated in a bath containing a strong solution of hydro-chloric acid, then transferred to the molten zinc, which is kept continually charged with dry muriate of ammonia. At each time the ammonia is added to the zinc, the salt (ammonia) is decomposed and the water of crystallization is driven off in dense volumes of steam, carrying with it portions of the acid

elements of the seething mass. The action in the zinc tub is so intense when the ammonia is added, that flames will dart up from the surface to the height of four and five feet. Even if there should be no chemical union of the elements driven off, forming an acid compound, irritant particles would be carried into the atmosphere by the intensity of the ebullition following each addition of ammonia to the zinc. The objectionable feature presented in this case is that, owing to its specific gravity, this pungent vapor is not carried very high into the atmosphere.

THE MANUFACTURE OF CUTLERY.—An invention by which the manufacture of cutlery and like articles is greatly facilitated was lately produced and patented by H. Hallstrom, of Eskilstuna, Sweden. A blank of sheet iron or steel is placed between two dies and hollowed out or concaved, and the concaved part is then punched out of the blank. In the same manner one end of a long blank, which has the length of the knife or fork, is placed between the dies and hollowed or concaved, and is then punched out. The pressed handle blanks consist of a right hand and a left hand blank, so that when the open sides are placed together a hollow handle is formed, one-half of which is made integral with the knife itself. The two handle blanks, after having been placed against each other, are then heated and placed between two dies and subjected to blows by which they are welded together and a hollow handle integral with the knife is formed. After having been welded, the knives and their handles are finished, ground and polished. Light, strong and durable handles can thus be made very easily and rapidly, and they can not become separated from the knife or fork. Handles for screw drivers, chisels, gimlets, draw knives, etc., can also be formed by this method.

AMERICAN BESSEMER CONVERTERS.—The Bessemer converters in England do not approach in productiveness those of the United States, but when it comes to the rail mills, it is difficult to ascertain which is entitled to the cake, the English or the American. The greatest tonnage of rails ever rolled in one week at the Edgar Thomson Steel Works, on one mill, was 4,110 gross tons. This was the week ended March 1st. The best work ever done in one week in England, on a single rail mill, was 4,310 tons of rails, or just 200 tons more than were rolled at the Edgar Thomson Works. This was the week ended February 9th. The mill that did this belongs to Bolekov, Vaughan & Co. Apparently, the English mill did the most work, but doubtless this is only apparently; for as a rule, English rails are much heavier than American rails, and hence the same number of passes through the rolls would give a greater tonnage in the one case than in the other. Unless the average weight of the rails produced by each mill were known, it would be impossible to ascertain which mill did the most work. The number of rails produced would doubtless be a fairer test of capacity than the number of tons.

ARTIFICIAL OBSIDIAN.—A Pittsburgh chemist is said to have rediscovered the lost art of making articles from obsidian, a species of volcanic glass, among them black mirrors which are used in making astronomical instruments. His attention was first directed to the subject in 1879, while on a visit to Pompeii. Here he found a fragment of a statue (an arm) made from obsidian, and its evident kinship to the lava, there so abundant, led him to think it might have been made therefrom. Bringing away with him his trophy and a quantity of lava, he began an investigation and a series of experiments which finally led him to a knowledge, not only of the component elements of obsidian, but also as to how it might be reproduced by artificial means. His first successful "melt" was made in Pittsburgh in the latter part of 1881. He made a number of ornamental articles and several slabs of the new glass went to New York City and set up a small furnace for its manufacture.

IMPROVEMENT IN WELDING BOILER SEAMS.—An inventor in Scotland has patented an apparatus for welding the seams of steam-boilers. For this purpose he employs a modification and extension of the roller flue-welding machine, well known in the United States, and extensively used in railroad shops. The device consists of a hydraulic cylinder and ram, the ram being fitted with two rollers—one to roll along and operate with welding pressure on the joint, and the other to roll along the opposite part of the shell, in combination with external blocks, which confine the shell and prevent its enlargement during the operation. There is no reason why a boiler shell should not be treated like a flue, and the joint welded instead of being riveted. Quite a good many experiments have been made with welding boiler seams, but the results have not encouraged boiler-makers to extend the practice. Perhaps the welds may prove more satisfactory when they are made with a heavy machine designed for the purpose.

THE LEAD BATH FOR HARDENING.—Users of the lead bath for heating for hardening make frequent mistakes in allowing something besides lead to form a portion of the bath, and also in allowing the bath to be kept below its proper temperature. Only pure lead should be used to obtain the full heat for hardening good tool steel. A mixture of lead and tin—a melted mass composed of pewter, type metal, and soft solder—is not a lead bath. The melting and heat holding qualities of metals are not alike.

SCIENTIFIC PROGRESS.

A New Method of Approach.

At an International Polar Conference held in 1879, at Helsingborg, a proposition was discussed and finally determined upon, to establish a series of circum-polar stations at the most practicable positions on the northerly limits of the various countries whose territorial limits enter within the upper limits of the arctic circle. In accordance with this plan some twelve or thirteen stations have been thus established, as follows:

The United States in Lady Franklin Bay, in Smith's Sound, and also at Point Barrow; Denmark at Godthaab; Germany in Cumberland Sound, on the western side of Davis Strait; England at Fort Rae, in the heart of the Hudson's Bay territory, near the Great Slave Lake; Russia at the mouth of the Lena and at Moller's Bay, Nova Zembla; Holland at Dickson's Haven; Norway at Boscop, in the Alten Fjord; Sweden at Spitzbergen; Austria at Jan Mayen Island, famous for its fog and ice. The Finnish Landak equipped a meteorological station at Solaukyla; a branch station was also established in Labrador. France selected a station near Cape Horn, and Germany also ventured into the Antarctic regions by sending a party to one of the islands of South Georgia, in 54 degrees south latitude and about 1,100 miles to the eastward of Cape Horn.

These stations are to forward and assist in every way practical the various special expeditions sent out by different governments; also to send out sledge expeditions at favorable times, and to make local meteorological and other observations. From several of these stations interesting reports have been received. Reports from the Finnish station Solaukyla were rich in scientific material. Experiments on a gigantic scale were made with the aurora borealis, and by an arrangement of batteries and wires along the face and up to the summit of a hill 1,000 feet high, an artificial aurora was produced which differed in neither appearance nor spectroscopic analysis from the natural article. A photograph could not be obtained even with the most sensitive dry plate. The English station at Fort Rae did good work, especially in spectroscopic observations. Good results have been obtained from the Swedish station at Spitzbergen.

The station at point Barrow, on the northern coast of Alaska, was in command of Lieut. P. H. Rae, who, together with his party, spent two years in scientific work. Having completed their building, the meteorological instruments were placed, and hourly observations were begun. The season being much advanced, the members of the expedition devoted much of their time to collecting botanical and zoological specimens. The magnetic work was very trying during the winter, as delicate instruments had to be manipulated and read in temperature as low as 45 degrees below zero. Over 90,000 readings were taken and recorded from December 1, 1881, to August 1, 1882. Meteorological work was done at the same time.

Phosphorescent Light.

In his "Science Notes," in a recent number of the *Gentleman's Magazine*, Prof. W. Mattien Williams says: "My note on this subject last July was preceded by one on the researches of Professor Radziszewski. I learn that he has actually separated the luminous matter of the *Pelagia noctiluca*, one of the multitude of species of marine animals that appear like little lumps of jelly, and produce the phosphorescence of the sea. He evaporated to dryness 180 specimens, and from the dry residue dissolved out by means of ether a peculiar kind of fat, which, mixed with potassa, gives out, when shaken, phosphorescent flashes. This is exactly what happens to the living animal. When quiescent it is not luminous, but if shaken or rubbed it flashes. I have collected and examined a great variety of these animals at different times, the most remarkable occasion being one morning after a magnificent display of marine luminosity in the Mediterranean, a few miles off the shore of Algiers. The surface of the sea was encrusted, I might almost say, with countless millions of small jelly-like creatures, of spherical, ovoid, oblong, dumb bell and other shapes, varying in size from a mustard seed to a pea; a bucketful of water taken over the ship's side appeared like sago broth. They were all internally dotted with a multitude of what I suppose to be germs, that would be liberated on the death and decay of the parent. The practical importance which I attach to the study of the luminosity of these creatures is the fact that they supply light without heat. The costliness of all our present methods of artificial illumination is due to the fact that we waste a largely disproportionate amount of energy in producing heat as well as light. This wastefulness may be illustrated by supposing that we obtain a pound of the phosphorescent fat of the *noctiluca* and divide it into two equal halves, making one-half into candles to burn in the ordinary manner, and using the other half to give out its light by cold phosphorescence. I am not able to give precise figures, but I believe that I am well within the truth in estimating that the candle would dissipate 95 per cent of the potential energy of the fat in the form of heat, giving but 5 per cent of the amount of light that the other half pound would emit as cool phosphorescence. Let us, then, hope that Professor

Radziszewski will continue his researches, and discover the whole secret of both the analysis and synthesis of this fat, and that of the glow-worms, the fireflies, etc. Now that we can supply the confectioner with the flavors of almonds, raspberries, jargonelle pears, nectarines, etc., and imitate the perfumes and the richest colors of nature's sweetest and brightest flowers, all by the chemical manipulation of coal tar, we need not despair of solving the chemical problem of transforming mutton suet, or palm oil, or vaseline, into glowworm, or *noctiluca* fat, to be used for illuminating purposes."

ASTRONOMICAL PROGRESS IN AMERICA.—The visits of foreign astronomers to observatories on American soil have of late years been very frequent, says *Science*; and it is not, perhaps, too much to say that the impressions they have carried away have in the main been of a pleasantly favorable and in some instances of even a surprising character. Occasionally they have made free to express themselves with regard to the somewhat rapid development of, and the future outlook for, their science in this country; but only infrequently have their opinions and criticisms been placed on permanent record. During the latter part of the summer of 1883, Dr. Ralph Copeland, astronomer to the Earl of Crawford and Balenres, and editor of the lately discontinued journal *Copernicus*, passed through the United States, and visited a goodly number of the more active observatories, among them those at Cambridge, Washington, Princeton, Albany and Clinton. His general impressions, as he modestly styles them, are far from uninteresting; and, while there is much that has been suggested before, American astronomy has not yet advanced to a stage where no opportunity offers for advantage from such suggestions.

IS RAINFALL ON THE WESTERN PLAINS INCREASING?—Travelers in the west during the past few years will surely have met the statement that the rainfall of the dry region beyond the Mississippi is increasing. Many western settlers express the basty conclusion that the change is a steadily progressing one, and is due to the cultivation of the ground; and the more venturesome theorists explain the increase as an effect of the better equalization of electric conditions of the atmosphere, as allowed by the laying of iron rails, and the stretching of iron wires across the plains. In regard to the above *Science* remarks: The natural extension of these theories pictures the plains in the near future redeemed from their present unprofitable dryness by persistent occupation. It is well to set these unwarrantable fancies face to face with the matter-of-fact statistics lately published by the signal service; for, whatever the doubtful possibilities of man's power may be, the connection of such small artificial changes with variation of rainfall in the relation of cause and effect is in the last degree questionable. There is not the least reason to think that the regime of the winds and rain can be permanently affected so easily, or that any progressive change is going on so rapidly as to make itself felt in a decade of years.

GELATINOSINE.—This product is obtained by boiling pine wood under pressure in a solution containing sulphurous acid and magnesia, in proportions of about 1.4 per cent magnesia to 4.4 per cent acid. The solution is then diluted with four times its volume of water, and muriatic acid is then added to it in sufficient quantity to saturate one-half of the base present. A gelatine solution is mixed with the acidified decoction, the proportions being about 10 pounds dry gelatine to 12 gallons of the wood decoction. The precipitate which forms is the gelatinosine, which is separated from the liquid and washed. Alum may, in some cases, be employed instead of the muriatic acid, as above. When either of these ingredients is used it is not necessary to mix them first with the wood decoction, as they can be added simultaneously with the gelatine solution. Alumen can be substituted for the gelatine and the obtained product is then called Alhologinoine. The two products are said to be applicable as mordants for dyeing and also for sizing purposes. The discovery has been made the subject of an English patent.

A NEW ELECTRO-MAGNET.—M. A. Ricco, of Palermo, has invented a very original electro-magnet. He rolls a long strip of sheet iron around a nut of soft iron, placing oiled paper between the different layers of the strip to isolate them. A pole is connected with the nut to which the inner end of the iron strip is soldered, while the other is connected with the outer end. The current passing through the strip magnetizes not only the nut, but also each layer of the strip of iron, which plays the double role of conductor and magnetic substance, so that the lines of power produced by the conductor are condensed. It is stated that the power of such a magnet is considerably greater than that of an ordinary electro-magnet.

A NEW POISON.—From the decomposing masses of animal flesh Prof. Briggs, of Berlin, has isolated a very violent poison, which analysis proves to be a hydrochloric salt of a new base, and which did not resemble any other known combination.

PLANTS AND SUN HEAT.—HEIT J. Wortmann produced curvatures in growing plants by causing radiant heat to strike on one side only. Sometimes a plant bent itself toward, but in other instances the plant curved away from the source of the heat.

MINING SCIENTIFIC PRESS

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W. B. EWER.

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Passing Events.

News from the mining districts, aside from what we give in our summary, is not specially interesting. The situation at Tombstone is unpleasant. Many of the mines are remaining shut down and many of the miners leaving. Great crowds of men are still going to Idaho to the new camps there, and many, as ought to be expected, are returning disappointed. They give the region a "black eye," while others are as hopeful as ever. As yet no very startling discoveries have been made this spring. They seem to have been more lucky with lode than with placer mining discoveries.

The Secretary of State has received a dispatch from our Minister to Mexico, announcing that the President of that republic had, in accordance with a decree of the Chamber of Deputies, given effect to the appropriation of \$100,000 to defray the expenses of the Government of Mexico at the World's Industrial and Cotton Centennial Exposition at New Orleans.

The Cloverdale *Reville* says that the San Francisco and Clear Lake Railroad Company has just completed the purchase of upward of 5,000 tons of steel rails, sufficient for the entire road from Napa to Clear Lake.

The Union Pacific Company expect to haul 30,000 tons of Anaconda copper ore from Butte, Montana, this season. The company is sending that amount to Swansea, Wales, to be worked.

Mill Samples.

In order to determine the percentage to which silver ore is worked in a mill it is necessary to carefully assay the ore by sample. The mill sample is taken usually by allowing the crushed ore as it comes from the battery to run into a pail which is held at the end of the trough or apron leading from the batteries to the tanks. In a well regulated mill a sample is taken every hour or half-hour, depending on the richness of the ore, and the accumulated samples taken during a single day are dried and thoroughly mixed, and the sample taken in the usual manner for assay.

Car samples and mill samples always differ greatly in yield, and the former is invariably higher in value. It is reasonable to suppose that this finely crushed material, being intimately mixed by the process, should furnish a fairer average; nevertheless the value of the mill sample depends entirely on the manner in which it is taken. Not only may it chance that the sample is caught just after an unusually rich or poor shovelful of ore has been supplied to the battery, but accident or neglect of proper precaution may affect the value of the assay. The dish or vessel placed to catch the crushed ore should not be allowed to become more than half full, and no water should be permitted to run over, as concentration would ensue immediately. It may happen that the trough is placed unevenly, so that more water runs off at one side than the other, and unless the sample represents the whole stream its value is likely to be greater or less, according to the part where it is taken.

In some mills the samples are taken from the pans after the sand has deposited itself there, by means of a troyer. Mr. James D. Hague, in investigating the subject, concludes that not only may accident determine the value of such a sample, but in the sand of the tanks the value of the slimes that have passed on without depositing themselves, and which are often quite rich, is not represented.

In a well arranged mill the wet pulp is discharged from the batteries and conducted by means of a trough into settling tanks, where it collects, care being taken that the sand is deposited in those tanks immediately behind the pans. The rear tanks can be used to settle the slimes or lighter material carried in suspension. Before the pans are discharged, sand is shoveled out of the tanks in front of the pans ready to charge them. This is the last opportunity which is afforded to sample the pulp. Of course it must be borne in mind that should a large quantity of rich slimes be run into the pans simultaneously it is almost practically impossible to get accurate tests of the ore. Where the slimes alone are to be worked they can be tested by sampling after settling; or where the slimes have been allowed to settle in the tanks and that material is charged with the rest of the pulp simultaneously, there is no difficulty in ascertaining the value of the material charged. Assays should always be made in duplicate. Not more than a half ounce is ever requisite for ordinary ore. With rich ore, quarter ounces assays are sufficient.

In cupelling buttons in the muffle furnace there is more or less loss. Very careful assayers place a specified amount of silver of known quality with lead in another cupel with the hatch of cupels in the muffle, and determine its actual loss, which amount is added to the other buttons. It has long been understood that the silver bars brought here are usually "understamped"—that is, they are more valuable than appears by the stamp of the local assayers or mill assayers. A great many thousand dollars have been made and lost by the different parties in handling these bars. It paid Flood and O'Brien to establish their own refinery in this city to handle their own metal from the bonanza mines.

Taking samples from the pans when charged with ore before the quicksilver is added does not answer very well, though it is often done, because there may be quicksilver or amalgam in the pan from previous charges, and there is liability of error. The system of sampling from cars or wagons, so commonly done on this coast, will not give results which show a true average. Taking the samples with a "troyer" from the settling tanks, or from the thoroughly mixed ore before it goes to the pans, will probably give the best results, when the slimes are considered as well.

The Quartz Mines.

Some two or three months since one of the papers published in Stockton called attention to the deposit of quartz sands in Dry Creek, a tributary of the Mokelumne, and urged the farmers of the foot hill valleys to take measures to suppress the "nuisance." The quartz sands of Plymouth and Amador City do not, however, reach the San Joaquin, but the operations of the great quartz mines on the mother lode, who dump their tailings into the tributaries of the San Joaquin, in combination with the operations of a small hydraulic mine at Jenny Lind, Calaveras county, was magnified into a great grievance, threatening the navigation of the San Joaquin. There has been, however, no more complaints of the operations of the quartz mines referred to.

There are also in our central and northern counties great quartz mines whose sands must necessarily at some time reach the navigable rivers, and it becomes them to reflect upon possible consequences. Such mines as the Sierra Buttes and Plumas Eureka use, we are informed, more than 100 stamps in their own mills, besides employing part of the season all disengaged custom mills. The capacity of each stamp is about two tons per day, and as the crushed quartz passes through screens punched fine enough to equal 3,600 apertures per square inch, and it is estimated there are 2,000 stamps running constantly in the counties where hydraulic mining is prosecuted to a greater or less extent, and fine matter goes further than coarse, quartz miners cannot be disinterested.

Should the principles of the Sawyer decision be maintained by the U. S. Supreme Court, quartz mining will be vulnerable, for, says the Judge, in his opinion, "The United States have not attempted or intended to confer upon the defendants any right or privilege to foul or fill the waters in question," and in conformity to that opinion he in his decree enjoins defendants "from causing or suffering to flow into said rivers, creeks, or tributary streams aforesaid therefrom, any of the tailings, boulders, cobble stones, gravel, sand, clay, or refuse matter resulting or arising from mining thereon. And, also, from allowing others to use the water supply of said several mines or mining claims, or any part thereof, for the purpose of washing into said rivers and streams any earth, rock, boulders, clay, sand, or solid material contained in any placer or gravel ground or mine."

This opinion and decree would have closed every quartz mine on the line of the defendant's ditches, had any been using their water, and it is now a bar to their sale of water for such purposes. The quartz miners will scarcely wait until they are in immediate jeopardy, but will probably unite in aiding the appeal in the Woodruff case, so as to remove the possibility of future trouble.

Gold Washing.

Throughout Central Asia about the following system of gold washing is pursued: A framework of light willow poles, with a convexity of about 35 degrees to the horizontal plane, takes the place of the usual washing box. Upon this framework, firmly fixed in the ground, is stretched a blanket or carpet to catch the auriferous alluvium. In order to retain the gold, which has, of course, a greater specific weight, thick horse-hair ropes are sewn along the whole length of the blanket. The frame being now ready, a bag full of ore stuff is emptied into it; water is then poured on, and stirred with a small stick, whilst stones are thrown aside. When thus a few hundred pounds of alluvial soil have been treated in this way, the men proceed to collect the sediment adhering to the blanket. For this purpose the blanket is taken off the frame, folded in several thicknesses, and subjected to another washing in the following way:

A wooden bowl or trough, large enough to contain the folded blanket, is placed in a small bay of the river where the current is slack. The workman removes the blanket, fold by fold, and washes it, allowing the sediment to collect at the bottom of the trough. Having accomplished this, he takes the bowl in his hands and moves it rapidly, with sudden jerks, to right and left, splashing the water and the lighter soil over the sides. From time to time more water is added, and the work is continued for several hours without intermission. As the gold in the bowl gradually detaches itself from the particles of sand mixed with it, the movements of the workman become more and more artistic and careful, his whole object being to leave nothing but the pure gold, however small the quantity, in his bowl. When this has been obtained, he dips a finger into the water and flicks a drop or two into his bowl, pouring them out, together with the gold, into a separate porcelain cup. This finishes his day's work.

The Fish Interests of California.

At the last meeting of the California Academy of Sciences, Mr. Joseph D. Redding, State Fish Commissioner, read a paper on the above subject, treating it from an economic standpoint, and not attempting to go into the mysteries of fish-culture. He referred to the geographical position and physical peculiarities of California, which gave it unrivalled advantages, not only for commercial and agricultural purposes, but for pisciculture. Within the past quarter of a century, fishing as a means of a livelihood, wherein each successful haul exhausted so much of the capital has developed and elevated itself into an industry ranking all others in the prolificness of its returns and the greatness of its possibilities.

The Commission of fisheries of California was appointed under an act of the Legislature, entitled, "An act to provide for the restoration and preservation of fish in the waters of the State," approved April 2, 1872. The gentlemen who first composed it devoted several years of arduous and enthusiastic labor, without compensation, to the subject, and to these gentlemen we are indebted for the progress our State has made in fish culture. Many choice varieties of fish have been introduced successfully, especially the shad, which is already beginning to fill our markets, and in one or two years will be as abundant and as cheap as the salmon. It has been proven that most any variety of fish can find a congenial home in our waters. The commission, with the assistance of the United States Fish Commission, has had hatched and deposited in the headwaters of the Sacramento and tributaries, within the last ten years, over 15,000,000 of young salmon. The result is that the Salmon catch in the Sacramento river has been marked and regular. This catch for 1875, was 5,098,000 pounds, in round numbers; for 1876, 5,311,000 pounds; for 1877, 6,490,000 pounds; for 1878, 6,520,000 pounds; for 1879, 4,432,000 pounds; for 1880, 10,837,000 pounds; for 1881, 9,600,000 pounds; for 1882, 9,605,000 pounds. This shows a general and continuous increase, with certain fluctuations incident to extreme droughts, or other natural disturbances.

Many streams have been replenished with our native and imported trout, by the efforts of the commissioners, and they have succeeded in passing important laws for the protection of the fish, during the spawning season; but the whole work up to the death of Mr. Redding, had been experimental. As he often remarked: "We are but on the threshold of this work. We are just beginning to find out what California can do in fish-culture." We fully appreciated that the object of the commission was not merely to stock our mountain streams and rivers with choice varieties for the sportsman and for the table, but to show to the people that it lies within their power to take a leading place in the commercial department of fish industry. Four things, at present, militate against the development of the salmon-canning industry, as well as the general progress of our fish interests: I.—The presence, in vast swarms of seals and sea lions at the Golden Gate. II.—The debris in the Sacramento river. III.—The universal disregard of the fish laws on the part of the fishermen themselves. IV.—Dams across streams.

The fishermen, especially the Chinese, wantonly destroy myriads of young fish, and the laws, as they now stand, are unavailing to reach them. The violation of the fish laws should constitute a felony, instead of a misdemeanor, and they should be enforced. We have all the experience and discoveries of older countries to aid us, and were we to seek the world over, there is no place that can compare with the Bay of San Francisco and the surrounding coast for natural advantages, with which to develop this new industry. The original members of the California Commission have accomplished a great work, and their reports are quoted as a standard authority. It now remains for the people of the State to take advantage of what has been shown to lie within their power. We have been first in the production of the precious metals. We are outstripping all other countries in the productions of the soil. We can easily take the lead in the products of our waters.

Fishermen will not obey the laws, and the laws themselves are inadequate. The \$5,000 appropriated by the Legislature could be easily spent for the single purpose of prosecuting violators of the fish laws on the Sacramento river. With so small an appropriation, what investigations and experiments can we make, in regard to our marine fishes and their culture, a branch of the industry hitherto untried? An appropriation of \$15,000 a year, at least, is needed, and it is very small indeed when we consider to what advantage it could be spent. With it we could establish our own salmon-hatching station on the McCloud and turn into the streams 10,000,000 of young salmon yearly. We could employ experienced deputies, clothed with the powers of sheriffs, to patrol our rivers. We could build ponds for black bass and white fish, and have three or four hatcheries for trout throughout the State.

Utilization of the Exhaust Steam in a Stamp Mill.

[Written for MINING AND SCIENTIFIC PRESS BY E. GUTZKOW.]

I wonder sometimes how many of the millions who travel in steam cars, proud of the aerit of being born in this fast century, and feeling a kind of proprietary interest in the invention of steam power, think of the opinion which future generations will hold this invention in. If one of us could return to this world in, say, 300 or 400 years, he would probably hear the historian of that period explain how the nineteenth century was distinguished by a certain cumbersome contrivance, still occasionally met with in some museum, called the steam engine, by which the people of those times managed to get a few per cent from the force of burning coal, and for that purpose depleted the earth above and below the surface of its never-returning fuel treasures.

The greatest portion of that waste of heat passes off, as everybody knows, in the exhaust steam. As long as no great inventor appears and teaches us how to convert that lost heat into force, propositions by which we can at least save it for other purposes ought to be always in order. This encourages me to give in the following some suggestions how, in a special case, in a stamp mill for roasting ores, the exhaust steam could be utilized. In stamp mills of that kind the ore is crushed dry, because it has to undergo roasting before further treatment. That this dry crushing is, on this coast, done by stamps, and not by rollers, as elsewhere, is due to our fondness for our California stamp mill and for mechanical roasters which require great fineness of the ore. There are, however, many drawbacks in dry-crushing as compared with wet-crushing. I will not dwell on minor matters, for instance the heating of the stamps, the dust, the short life of the sieves, but the necessity of drying the wet ore as it comes from the mine is a source of much annoyance and expense, and the greatest objection is that the output is very much smaller, often only one-half of that from wet crushing; that is, a mill of 40 stamps may crush 100 tons of ore wet, and only 50 tons dry. It is apparent that, if we crush our ore wet and could dry it in a cheap and practical way by our exhaust-steam otherwise wasted, we would save half of our plant in stamps, and also much in the size of our engine, the number of our boilers and in the fuel to run the latter. In order to prove that this proposition is quite feasible it will be necessary: 1. To calculate the moisture in the wet pulp. 2. The heat at disposal in the exhaust-steam. 3. To explain the apparatus required and to give some figures from actual experiments.

Ad 1. The water retained in the wet pulp when taken from the settling tanks is much less than a casual observer will think. Rittinger, an excellent authority, states it to be 20 per cent for coarse ore and 25 per cent for slimes. I find that an addition of 30 per cent of water will convert any ordinary quartzose ore that has gone through a No. 40 sieve into a thin pulp. This will correspond to the evaporation of 3 tons of water for 10 tons of dry ore.

Ad 2. In an average steam-engine between 20 and 30 pounds of steam are consumed hourly per net horse-power. In a 50 horse-power engine between 24,000 and 30,000 pounds of steam escape daily with the exhaust. As one pound of steam may, theoretically, evaporate one pound of water the above quantity of steam could deprive 40 or 50 tons of wet ore of its moisture. In practice, of course, it will be less; the amount required to heat the boiler-feed-water has also to be deducted. Still, in an apparatus like the one to be described, where the steam acts on an enormous surface and the wet pulp spread in a thin layer presents to the atmosphere a correspondingly large area, the effects of steam as fuel is remarkably high.

Ad 3. I had yet no opportunity to experiment with ore on a large scale, but happened to gain considerable experience with the drying of another substance under very similar circumstances. Some years ago I introduced the utilization of "bittern," the mother liquor from the making of sea-salt at some works in the vicinity of this city, and had to manufacture from it daily about 400 pounds of carbonate of magnesia. This substance is distinguished by large absorbing power for liquids, and is consequently used in making certain nitro-glycerine compounds. The pulp which I retained on a filter held not less than 15 pounds water for one pound of dry substance. As it was not advisable to remove part of this water by mechanical means, I had to evaporate every 24 hours fully 6,000 pounds of water contained in about 100 cubic feet of pulp. This was done by the exhaust from an eight horse-power engine, or, rather, as the engine happened to be a strong steam-eater, by an engine consuming 60 pounds of coal per hour.

The steam dryer is made entirely of wood and galvanized iron. I do not claim for it any novelty. Similar ones have been in use for drying salt for a long time. Still, it is so cheap and effectual, that it will well bear a closer description. The galvanized iron coming in sheets seven feet long, a table is formed about one foot over the intended floor level of joists and

tongued and grooved redwood boards, one hundred feet long, and seven feet wide. All around a rim is laid of four by six redwood beams, halved together six inches high. A long scantling is nailed lengthwise in the centre, as auxiliary support for the iron sheet. This is prepared on the place in one piece for the full 100 feet of galvanized iron, No. 20, riveted together, the holes one inch apart, turned to bring the flat side of the rivets uppermost, spiked down into the four by six redwood beams, with galvanized 20-penny nails, soldered where necessary. Now, only a two by four scantling has to be laid, covering the nail heads, and forming a rim all around, and every three feet a three-fourth-inch bolt driven through rim, sheet and table, and the whole is finished. This dryer, which required no repairs thus far, cost \$150 for sheets and plumbing, and as much for lumber and other labor, or \$3.00 per running foot.

require a more solid construction of the drying table and more labor. If the apparatus is expected to do as much work for ore as for magnesia, it would answer for drying ten tons ore daily, and the ore pulp would stand two and a half inches high. Perhaps it would be necessary to run the dry ore through some light Corrish rollers to break up any lumps formed, when the salt, if required, may be mixed in. Of course salt ought not to be mixed to the wet ore.

I need not go into further details. Every millman will see that the plant could be placed about side the settling tanks, and that the spreading and discharging of the ore can be facilitated by mechanical contrivances. Of course I do not expect that foundrymen will take kindly to an innovation which tends to reduce the plant of an ore mill. There is no fighting against human nature. Neither will the



UPPER WOOD RIVER MINING REGION, IDAHO.

There were two of these drying tables, making, with \$400 for the commodious shed, \$1,000 the total cost of the whole concern.

I would not have succeeded in making the little steam at disposal, do all what was required without a contrivance which is possibly new, although plain enough. The two drying tables were placed side by side, four feet apart. The exhaust could pass under either. The outlet was close to the inlet, the drying chambers under both tables at the further end in connection by four-inch pipe. Thus, by opening or closing suitable stopcocks, the steam passed under the 200 feet of drying table, and could be reversed. By methodically charging with wet pulp and regularly changing the steam current once every twelve hours, the steam would always meet the most dry pulp first and the least dry last. The pulp is spread about one inch thick. One man who has other work for the rest of the day attends to it the first thing in the morning and the last in the evening. Each charging and discharging takes one hour, or two hours for both pans every twenty-four hours.

In applying these facts to the drying of ore pulp it must be borne in mind that magnesia, which retains after drying almost the full bulk of the wet pulp, and is consequently a very light and porous substance and an extremely bad conductor of heat, presents one of the most unfavorable conditions. On the other hand, the rougher handling at an ore mill would

circumstance that no patent is attached to my proposition serve as a recommendation, because no capitalist thinks much of an idea he need not pay for. Still I hope that some time somebody somewhere will give it further attention.

The Wood River Country.

That portion of Alturas county, Idaho, known collectively as the Wood River Country, is still in its infancy as a mining section, but the number, size and richness of its lodes, the facility with which they can be opened and worked, and the natural advantage of the region in respect to wood and water, have brought it rapidly to the front. Wood River takes its source in the same range of mountains as the Salmon river, the latter flowing to the north, and Wood River in a southerly direction, to its confluence with the Snake river. The mining camps are scattered along the river.

Galena district comprises the mining section at the head of Wood River, with the town of Galena as its supply depot. The accompanying map, together with a few notes, we take from the last report of the Director of the U. S. Mint.

The chief group of mines is the Senate group, owned by the Senate Mining and Smelting Co. The Senate, Red Cloud, Chief, None Such and Kid mines, constitute this group, and are all

rich and permanent looking prospects. The property of the company is in good shape for successful and prosperous operations. They have a smelter. They have also the Scorpion claim, a valuable lime quarry, which provides flux for the smelter.

The Conway Castle, President, and Delta, adjoin the Senate and Red Cloud, and are the property of the Conway Castle Mining Co., a New York organization. A tunnel has been run on the vein of the Conway Castle. A continuous vein has been found in the President. The company have constructed good roads, blacksmith shop, boarding house, etc.

Important discovery is the Dresden. The ledge has a prominent cropping of white lime, which is traceable for 2,000 feet, and so far wherever this cap is removed the galena appears.

Death of Colonel Williams.

Colonel A. F. Williams who has since early times been connected with the mining interests of this coast—and particularly those of California—died at his residence in Oakland on Wednesday. Colonel Williams came to California in 1850. As he was a professional civil engineer he pushed into Nevada county, where he engaged in surveying and constructing mining ditches, a business he has followed ever since. He brought the first water into Oroville and also constructed the laying ditches in Nevada county. From Nevada county Colonel Williams went to Sierra county in 1852, where he engaged in constructing mining ditches in the vicinities of Pine Grove, Howland Flat and La Porte. He was one of the original owners of the Blue Gravel Mining Company of Smartsville.

About four years ago, in company with a number of capitalists of Alameda county, the Colonel sent out an expedition to Alaska for mining purposes, an enterprise in which he took an active part. A schooner was purchased and the expedition started off under command of Col. Williams. Ledges of galena were found, and arrangements made to work them. Some ore was taken out for shipment to this city. The vessel belonging to the expedition was wrecked on Golovin bay. In open boats the prospectors and crew proceeded to the islands of St. Michael, a distance of several hundred miles. The shipwrecked party were taken from the islands by the United States revenue cutter Corwin, and were brought back here. Last spring the Colonel fitted out another expedition to Alaska, but his health prevented him from making another sea voyage, and Mr. John Lawry, of Centerville, was placed in command. Nothing has been heard of the result of the last expedition, but news will probably reach here this fall. Colonel Williams was a man of energy and good practical sense. He was well liked by all his associates, and upright and honorable in all his dealings. He was 72 years of age.

Tests for Ores.

From a chapter on "Tests for Ores" in a little work on "Assaying Gold and Silver Ores," by C. H. Aaron, (published by Dewey & Co.) we take a few paragraphs, as follows:

Silver.—Powder, mix about a grain with twice as much fine lead (free from silver), soda, and borax. Moisture with water, place in cavity scooped in pieces of charcoal, smelt by blow-pipe flame, cupel the bead, examine bead with lens, if large enough to handle, part for gold. Or, powder, roast, boil in glass or earthen vessel with a clean strip of copper, bluestone, salt and water, gives a white coat on the copper. (Nearly all silver ores will do so if boiled with bluestone and salt, without roasting.)

Gold.—Powder, roast if sulphurets are present, grind very fine and wash in pan or horn, examine with lens; yellow flattened particles not dissolved by nitric acid.

Copper.—Powder, moisten with salt brine and throw into fire; an intensely blue flame. Or, moisten with muriatic acid, and direct blow-pipe flame on it; the same. Or, roast, steep in ammonia; a blue solution. Or, boil in acid and add ammonia; the same.

Lead.—Powder, mix about one grain with four grains of soda, a little borax, and water to moisten, place on charcoal and melt under blow-pipe flame; gives a malleable, metallic globule, which when melted on a cupel gradually disappears, leaving a yellow stain and perhaps a bead of silver; or a coat on the charcoal which is dark lemon-yellow hot, sulphur-yellow cold; disappears on being heated but not touched by the blow-pipe flame.

A BIG MINING SUIT.—A big suit between the Albion Con. Mining Company and the Richmond Mining Company, of Nevada, has been set for trial in the District Court at Eureka, on June 9th. The suit was commenced in May, 1882, and is for the recovery of 5,000 tons of ore or its value at \$100 per ton, aggregating \$500,000; and also for \$50,000 damages alleged to have been done to the Albion mine, making in all \$550,000, for which the Albion Company asks judgment against the Richmond Company.

In April the Denver & Rio Grande took east to the Missouri river 3,828,000 pounds of Utah bullion. The road carries one-third of all the bullion product of Utah which is sent East.

Nevada a Good Country Yet.

There are some people living in this State who have much confidence in it, and the editor of the *Reno Gazette* is one of them. He says: "The State of Nevada is under a temporary cloud, but there are some things about it which must not be forgotten—some things which sharp business men should always keep in sight. It has not yet been a State twenty years. It has never contained more than 65,000 people, yet it has yielded more gold and silver, and paid more dividends from its mines than any other three or four States or Territories combined, except California. Its people have purchased from other States and Territories more material than the same number of men ever purchased in the same length of time; and it has paid in gold and silver for all it has bought. The bullion of Nevada between 1860 and 1864, acting as a lever in the national finances, did more to uphold the credit of the country than did the product of the most powerful Eastern States; and because of that product and the product of California and the interior Territories those in power had the material with which to meet the country's interest obligations—the courage to commence to pay the mighty debt, and finally to bring around resumption and a reduction of fifty per cent in the rate of interest. A State which has been so important, which still remains with but two or three exhausted mines, and with plenty of others which have never yet been more than surface-scratched, should not be dismissed with a sneer. It must be borne in mind, too, that a great many of the camps of Nevada have been worked from 100 to 250 miles from the railroad, and all kinds of mining supplies are 100 per cent higher than they would be if proper railroad facilities extended throughout the State. If under such circumstances Nevada has been made to pay, there must be some unusual merit in its mines, and the time will soon come when Nevada will again take her place at the head of bullion producing States. Its gold and silver are not its only minerals. There are besides, vast beds of iron, horax, gypsum, sulphur, copper, antimony, lead and many other valuable minerals, which are more used than either silver or gold. It is only a question of time when all these resources will be looked after by the shrewd men of capital who will build railroads, erect reduction works and open up to the people a new era of prosperity, increase the population, enhance the value of property and make us feel that Nevada is one of the great States.

THE POLARIS STRIKE.—It is quite certain that the recent developments in the Polaris mine at Columbia will give an impetus to mining operations never heretofore experienced in that section. There are scores of other ledges in the immediate vicinity which prospect as favorably on the surface, and which are likely to prove as valuable when developed to the same extent. If the reports of the Polaris strike are correct, it is the most extensive and important one ever made in Eastern Nevada, and making allowance for the enthusiasm of those who have examined it, it is perfectly evident that it is of sufficient importance to justify the prosecution of more active and extensive operations than were ever before projected in the district. The following is the result of seven assays made here yesterday from ore from different portions of the ledge. They were taken from various points in the workings and from different classes of ore, with a view of obtaining reliable information in regard to the respective values. The following is the result: No. 1, \$249.93; No. 2, \$1,509.20; No. 3, \$181.35; No. 5, \$645.88; No. 5, \$62.33; No. 6, \$63.26; No. 7, \$590.20; average, \$471.16.—*Tuscarora Times-Review*.

MINERAL STATISTICS.—A Blue-book on the mineral statistics of the United Kingdom for 1882, prepared by her Majesty's Inspectors of Mines, has just been issued. The general summary given of the mineral produce in Great Britain and Ireland in 1882 shows that during that year were raised 156,499,977 tons of coal, of the value (at the mine) of £44,118,400; 226 oz. of gold, realizing £863 at the average market price, and 372,544 oz. of silver, of the value of £80,426. The quantity of iron ore raised was 18,031,957 tons, representing a value of £5,779,285 at the mine, and of metal contained in this ore 6,513,281 tons, of the value of £18,237,186. The total value of the minerals raised in 1882 was £54,879,507, and of the metal contained in the ores £20,558,050.

A GOLD-SAVING MACHINE.—The *Tuscarora Times-Review* says: Sam. Mazingo and Mr. Kenney, of Battle Mountain, have a gold-saving machine, the latter's invention, which they intend in a short time to take over to Snake river for the purpose of experimenting with the fine gold in those placers. It is to be placed at the end of sluices, and is something on the principle of a rocker, which can be worked either by water, steam, horse or even man power. From the results of experiments already made, the owners are confident that there is no gold so fine that their machine will not save it. An application for a patent is on file.

NITER.—There is quite an excitement down at Big Meadows about the Hunnhold niter beds, eight or ten miles south of Lovelock on the Central Pacific. The deposits have been located for a distance of four or five miles, and notices of a great many claims have been filed for record in the County Recorder's office.

The Sierras and the Himalayas.

[A Comparison Between the Forests of the Sierra Nevada Mountains and Those of the Himalaya. Translated from the German of R. Von Schlagintweit by Professor Granville F. Foster, for the *Reno Gazette*.]

Among the many beauties of California, the forests, that magnificent ornament of the far-stretching and mighty Sierra Nevada, occupies one of the most prominent positions. Although the transient view of the same charms the tourist as he is whirled in rapid flight over the Pacific railroad, yet it is well nigh impossible for him to have even a suspicion much less any correct idea of the sublime and charming wonders of nature which would unfold themselves at every step before his astonished and delighted gaze in inexhaustible profusion, should he happen to leave the train sometime during the summer months at any one of the stations which lie high up in the mountains, and thus to seize upon one of the many opportunities which here so often present themselves to learn by closer view the interior of the country.

More than once in such excursions would the forests of California forcibly recall to mind those in that loftiest range of mountains, the Himalayas (which I have also visited) and at such times would I be led to make the comparison between them which I here append for the benefit of the reader.

We find in the Sierra Nevada that the natural

which surround it jealously, which rob it of its choicest juices, which deprive it of the space necessary to its complete development. In this

Complete Development in the Forests of California

Can the trees be seen, the eyes resting, well pleased and delighted, on the dark green of the leaves and indeed upon the harmonious blending of colors in all parts of the trees themselves, while the glory and beauty of these become enhanced by a carpet beneath, most gorgeously woven out of numberless rich-blooming flowers, magnificent both as to form and color, and out of a large variety of grasses, most delicate and beautiful both as to shape and hue—a carpet with which the forest floor in this region is almost always adorned. But in a tropical forest each plant-form continually strives to supplant and to kill out every other form. No tree there can attain to its greatest size or reach its complete development, since between the numberless twigs and branches of the tree itself, there twist and wind in manifold forms, in thousands of varieties, twining plants, ferns as tall as a man, besides which there is a prodigious growth of parasitic plants. The tropical forest is overpowered, hardened by the very superabundance and luxuriance of its own plant-forms. Fruitless indeed will be any endeavor on our part to discover in tropical forests the least trace of regularity. There rules there, on the contrary, a chaos, an irregular mass, a perfect confusion of trees, shrubs, grasses, climbing, and parasitic plants of every kind and variety. There, too, will the eye soon tire, not the less because of the glaring, obtrusive colors which

that which collects in the lower or deeper-lying places, in ponds, or more truthfully in sloughs or puddles, does not refresh when ingested. It is warm, instead of allaying, it increases thirst and when used in large quantities, excites a general malaise, which often instead of soon passing away, leads to high and violent fevers, or to some other of the dangerous diseases. It can only be used without detriment to health when hoiled, or after it has undergone the tedious process of filtration. As we wander through the pathless jungles, a gloomy sadness seizes us when we reflect what sovereignty man possesses, even when his knowledge and capacity for labor have been tested to the utmost over this particular world, so at enmity with him.

But from every point of view, what a different picture do the forests of the Sierra Nevada present! What a striking but charming contrast. Here blows a clear, pure, refreshing, animating and strengthening wind; now here, now there, bubbles up from the earth beneath, springs of the most precious waters—clear and pure as crystal; now here, now there, pours over the rocks a roaring torrent. In the Sierra Nevada and still more in the Himalaya (which, from their great height, we do not reckon as tropical in their flora) it frequently happens that different circumstances combine to lighten into still greater degree the natural beauty of the forest. The climate, as in the Sierra Nevada, is simply glorious; no cloud in summer ever obscures the deep blue vault of heaven, and the temperature of the air is neither too hot nor too cold. Now, between trees, flowers and the most luxuriant green, we enter some narrow valley. Traveling along this valley, we



SCENE IN THE HIGH SIERRAS OF CALIFORNIA.

glory of the forest is greatly heightened in the summer season by an over-arching sky never for once obscured by clouds—a sky which in purity, brilliancy and splendor, equals that of tropical regions, without ever consuming us in its glowing fervor, as does the latter. In the Himalayas, and in the Sierras, are trees which seem to possess a correct presentiment and thus fearful lest otherwise they might have been seized by the powerful and equally destroying as well as creating hand of man, and thus made to breathe out their tender lives beneath the strokes of the woodman's axe, are found growing on precipices so steep and so inaccessible, that possibly the feet of man may never be able to tread thereon. In both regions,

A Fragrant, Balsamic Air,

which we breathe with indescribable delight, whistles gently at all hours during the daytime in these magnificent forests, through which there constantly passes a mysterious whispering and rustling. Especially in summer, when in California the days are almost continually cloudless, are the evenings even in those forests, which reach an altitude of 6,000 feet, incomparably beautiful, since, at that time of the year, there is a rich and varied vegetation, and in the evenings rather than during the daytime, the very air seems loaded with the perfume of myriads of odoriferous shrubs and flowers.

The various kinds of coniferous trees, which, spreading over vast areas in magnificent forests, adorn the crests and declivities of the Sierra Nevada, form equally well a "primeval forest" as do the thickest jungles and far-stretching forests of India at the base of the Himalayas, or those of Southern and tropical America. But how vastly different is such a forest in California or in the higher Himalayas, from a tropical one! In the forest region of California each tree grows to its full perfection, since there is no profuse growth of climbing plants, no powerful ferns, no troublesome parasite plants

the leaves present on all sides than in consequence of their myriad forms and their total lack of regularity. It is impossible to avoid the sad conviction which obtrudes itself forcibly on the mind that here the vegetable kingdom develops its plant-forms in such a manner that the noble and perfect ones are oppressed and stifled, while on the contrary, in opposition to all the laws of harmony and beauty, the common and lower forms are favored and assisted. It is not there the survival of the fittest, but of the hardest and strongest which obtains there.

Just in the same ratio as we in California search with the most pleasant of anticipations for every place in which the giant trees lift up to heaven with joy their lofty forms, so do we avoid on the contrary just as much as possible any lengthened delay in tropical forests, not because of any apprehension of any unpleasant meeting with the fierce and ravenous beasts that make their habitat therein, but simply from the natural disinclination to expose ourselves to influences highly pernicious—in the prejudicial to health—influences which here bear full and complete sway over us, against which we cannot oppose anything with any hope of success, our knowledge here completely failing, leaving us well-nigh powerless and defenseless.

Beauties of the Sierra.

The atmosphere of tropical forests is of itself full of vapors, is humid, oppressive, sultry and is further rendered pestilential by miasmatic vapors, exhaled from enormous masses of decaying vegetation. The ground is constantly moist, oftentimes covered inches thick with plants, leaves, broken branches, all lying prostrate in the mass and seething with corruption. Beneath these fallen materials, sometimes quite covered with them, and often thus hidden from the eye, frequently steal along muddy and slimy streams, or occasionally water in the form of isolated brooks. The water of these streams, as well as

come at length, suddenly and unexpectedly, to a head in the same, passing which, and behold! before us stands one of those most sublime of mountain peaks (of which there are so many both in the Sierra Nevada and Himalaya) rising thousands of feet, and clothed with the most dazzling, blinding white snow, creating one of the most brilliant and beautiful contrasts, between the pure, dazzling white, on one hand, and the delicate tints of green which surround us on all sides in the valley. Our guides, the Hindoos, prostrate themselves to the earth, and we hear them devoutly murmur their low-spoken prayers to the supposed Deity that resides on the mountain summit. Even we are greatly affected, and stand captivated and charmed in speechless admiration. The appearance is so sudden, so unexpected, and at the same time so imposing, that it produces in us a deep, overpowering effect, making an impression on our minds which nothing is able to efface. I can to-day vividly recall many such grandly beautiful scenes in nature, many of which I saw years since in the wide extended plain of the Ganges, as I turned my eyes in the direction of the mountains. It is just such scenes as these, which, making the Himalayas so beautiful, lend a peculiar, and to a stranger, a never-to-be looked-for charm to the landscape, which, in itself alone, is ever a sufficient compensation for all the trouble and fatigue which we are obliged to undergo ere it is possible for us to procure for our enjoyment so rich a pleasure; but as prodigally as the Himalayas have been endowed by nature with beauties, inexhaustible in quantity and kind, yet there is wanting there one of the grandest ornaments of the California forests, namely, those giant trees which appear here and there in a few places in the not so lofty, but not less beautiful, Sierra Nevada, known in California as the "big trees"—the old, venerable sequoias, at one time known in England as the *Wellingtonia gigantea*, and in America as the *Washingtonia gigantea*.

Gold-Saving Machines.

The Snake river placer mines have adopted what is known as the Edwards Gold-Saving Machine. It is described by the Idaho Register. In the Edwards machine, now in use here, the grizzly is laid about twenty feet in length in the sluice box, but what passes through falls into an under division or lower story of the same box, and this lower compartment has a solid bottom, except where one large hole or slot is left to let the water drop out. Now, instead of dropping to the ground, this water, containing, as it does, all of the gold and black sand, drops into a wide, flat and singularly constructed sluice box, which rests nearly flat on the ground. The water has to fall, say about two feet, into this last box, the main stem of which is at right angles with the upper box, about ten feet on each side, or like a cross. Imagine a box, or boxes, in the shape of a comb; this comb (box) has eight teeth, each tooth ten feet long and three feet wide, and pointing toward the river.

Now go back. The water from the grizzly drops into the flat sluice box; is spread out to each end of the (comb back) box, and through little gates is let into the (teeth) boxes. All of the last are carpeted with burlap cloth, and as the water runs shallow over the burlap, the gold and sand are caught in the nap or precipitated; the water passes out into the river. After about a day's run the burlap is taken up and washed out, like a dirty sheet into a tub. Still to the naked eye very little gold is visible. Quicksilver and acid are put into the tub and the gold is amalgamated. Some of the more advanced have a small arastra, built inside of a large tub made for the purpose. By this process amalgamation is more complete. It is claimed that ninety-five per cent of gold in the ground is saved. The cost of one machine, or system of boxes, is probably about \$100.

Ore in Small Lots.

The article in the MINING & SCIENTIFIC PRESS, entitled "Ore in Small Lots," seems to have been generally favored by our Idaho exchanges, and it is evident that all unite in upholding the practicability of the market therein proposed for ore in small lots coming from our smaller mines and prospects, viz: That market afforded by the business merchant, who, seeing a good profit in the accumulation of such lots, is willing to advance money on small samples that cannot be handled with profit by the larger dealers and reduction works. The merchant thus interesting himself in behalf of the prospector does an inestimable good to the community at large, and indirectly nourishes his own interests by effecting a more prosperous condition among the prospecting class, and encouraging the development of treasures that without this trifling aid would doubtless often lie hidden by the hand of poverty. There are many enterprising heads and able hands in nearly every mining community that are compelled to forsake the brightest prospects and often near fortunes in the want of a few dollars worth of provisions and tools necessary to carry on the work of development. Such men are usually enthusiastic and need only the stimulus of the most trifling, but most essential encouragement to continue in the earnest work that is sure to bring them a just reward. They are often found in the possession of a few hundred pounds or a few tons of rich ore, the sale of which would bring them sufficient returns to carry on the work of turning their prospects into mines, and the assistance afforded them by the community at large is just so much toward the public wealth.—*Ketchum Kystowne.*

THE FASCINATION OF THE GOLD MINES.—An old forty niner says of gold hunting: "It's the fascination of it. Lor' man, when you've struck it pretty rich and can see yer gold right in front of you; when you're piling it up every half hour o' day, with a nugget now and again as big as a bullet to cheer you, and when the evenin' comes and count it up and find a hundred odd dollars just picked out o' the earth that day—well, there ain't nothin' like it. Then when you don't strike it rich you always think you're goin' to next day, an' it's just as exciting hearin' other men tell in the evenin' what they pulled out as it is countin' over your own. Why, I've been three and four months at a time without makin' a dollar and without a cent in my pocket; but gee-whittaker! the excitement of it don't give a man time to think how hard up he is."

THE HOTELING IRON MINE repairs on the furnace of the mine are now nearly completed, and in a few weeks more at the furthest, it will be in full blast. During the winter the company have been manufacturing charcoal which they ran do much more rapidly than formerly for they have altogether something like sixty patent kilns and coal pits. During the late storms the roads were so bad that it was impossible to do any hauling but that difficulty has been removed. The output of metal, it is confidently believed, will be greater this season than in any previous year.—*Argus.*

THE NEW TAILINGS CONCENTRATOR.—It appears that the new concentrating apparatus to be used in working the big reservoir of tailings down on Six-mile Canyon, is the invention of Mr. Dillon, a Comstock mechanic, with improvements by Mr. O'Neale. The machine will separate the metallic constituents from the worthless sand very rapidly and cheaply.—*Virginia Enterprise.*

USEFUL INFORMATION.

How to Overcome the Destructive Moths.

This is one of the greatest vexations which careful housekeepers have to contend with, and their depredations are not to be remedied after they have once made inroads. Houses heated by furnaces are especially predisposed to have moths, but every housekeeper must be on the watch for them, for, from the time that the windows begin to be left open, the trouble begins. Heavy carpets sometimes do not require taking up every year, unless in constant use. Take out the tacks from these, fold the carpets back, wash the floor in strong suds with a tablespoonful of borax dissolved in them. Dash with insect powder or lay with tobacco leaves along the edge and re-tack. All moths can be kept away and eggs destroyed by this means. Ingrain, or other carpets, after shaking, are brightened by sprinkling a pound of salt over the surface and sweeping carefully and thoroughly. It is also an excellent plan to wipe off the carpet with borax water, using a thick flannel cloth wrung tightly, taking care not to wet it, but only to dampen. Open the windows and dry the carpet before replacing the furniture. Other woollens including blankets and wearing apparel, must be beaten and brushed and folded smoothly. Be careful to clean every grease spot with ammonia and water, not too strong, and a dark woolen cloth. Tie pieces of camphor into little bundles and put one in each article. Wrap the article in newspaper, as printer's ink is a great preventive of moths, and sew them up in strong sheeting bags, labelled, so that it will not be necessary to open them during the summer except for use. This is a good way for those who do not possess cedar boxes, and the articles need have no other care if every spot is treated as directed and the garments are not left hanging in the closet too long before putting away for the season.—*Providence Star.*

MULTIPLYING USES FOR WIRE.—Future analysts may well describe this period of American history as the wire age, says the Boston Advertiser. In no part of the economy of our daily life are we divorced from wire. It is our slave, and yet an ever present master. Sleeping, we repose on wire mattresses. Eating we see foods that have passed through sieves and which are sheltered from insect appetite by wire covers. Calling we pull wires to ring curled wire gongs. Traveling we are conveyed by cable or electric railways, hoisted by elevators hung on wires, and hurried over wire bridges. We announce our coming by telegraph or telephone wires, and we thread our way by night through streets lighted by means of electric cables. Across our fields are strung many thousands of miles of barbed wire fences, against which dumb brutes protest. Texas rangers draw the knife, and lawyers, judges and reporters whet their intellectual blades. Our clocks are set by wires, our watches run by wires, our books are stitched with wire, our pictures are hung by wires, and our politics managed by wires, and we add by wire-pullers.

WOOD PULP.—In the first stages of the manufacture of wood pulp for paper, poplar was regarded as pre-eminently adapted for the purpose, and for a considerable time it was thought that only that wood, basswood, and a few other kinds could be ground into a suitable pulp. Now, however, machines are made which turn out pulp with equal facility from all kinds of wood. The longest fiber is made from willow; basswood and poplar ranking next respectively. Cedar, fir and hemlock are said to work alike; maple has a fiber shorter than either spruce or pine, and is quite hard to grind; birch is very hard and grinds quite short. Poplar and buckeye pulps remain white for a considerable time, other woods changing color; birch becomes pink, maple turns purple, and basswood takes on a reddish hue.

COATING FOR STONE.—The application of alkaline silicates to the exterior of buildings to prevent the deterioration of stone has not been attended with satisfactory results. H. L. Kessler proposes to use a solution of fluo-silicates of bases whose oxides and carbonates are insoluble in a free state. When soft limestone is saturated with a concentrated solution of a fluo-silicate of magnesium, zinc or lead, a very considerable degree of induration is soon reached, and the resulting products, except the liberated carbonic anhydride, are less soluble than the stone itself. No varnish is formed, and therefore no danger arises from the expansion of frost beneath it. The process has resisted the severe tests of winter. Colors may be introduced satisfactorily.

A USEFUL PLANT.—In the French journal, *Larancie*, M. Paillex calls attention to a Japanese plant named *Kusu* (*Pueraria Thunbergiana*), the roots of which contain starch, while the leaves and shoots are used as food. Its fibrous portions are adapted for use in the manufacture of cordage. It is a lofty and hardy plant, attaining within a year to the height of between twelve and twenty-five feet. It yields fruit, and grows upon the most unfruitful dry ground, where nothing else would thrive, provided there is a sufficiency of warmth. It requires no care, and can be propagated by seeds or by planting.

CHEMISTRY IN CHINA.—The Chinese are beginning to adopt western chemical science, and a

factory has recently been erected for the manufacture of sulphuric acid on a large scale. Two well known chemical text-books—Malgutti's Elementary chemistry, and the Chemical analysis of Fresenius have also been translated into Chinese, with the help of a great number of new characters, and adopted in the imperial colleges. His excellency Tong Kiu Siug, the first minister, has taken the work under his immediate patronage, and written the preface for the first of these books.

AMMONIA.—More than fifty patents, it is said, have been taken out for the making of ammonia within the last two years, in England, America, Belgium, France Austria and Germany. Many of the schemes have been patented in all the countries at once. The patents apply to gas works, oil works, blast furnaces, alkali works, and sewage works. Ammonia seems to share with electricity the present attention of the patentee world.

LINOLEUM can be kept perfectly fresh and bright if, after washing, it is rubbed over with new milk which has been thoroughly skimmed, so as to remove all traces of cream. If any cream is left in the milk the surface remains sticky, and rapidly becomes soiled. The skin-milk forms, when dry, a smooth elastic varnish, which permanently protects the linoleum and assists it in resisting wear.

THE banana is probably the most productive food plant that grows. It is asserted that upwards of two tons of fruit can be produced from a single acre planted with bananas; and that the area that would be required to raise wheat enough to sustain one man would produce bananas sufficient to sustain more than 50 men.

BRICK VS. IRON.—An architect of New York, speaking of building material, says: "Under the rational order of things, brick will survive centuries without showing its age, but an iron structure, under the best of care, will begin to show the weight of years by the close of the first century."

ALUMINUM can be beaten out, either hot or cold, as perfectly as gold or silver, and can be rolled in the same way. Leaves as thin as those for gilding and silvering can be made of it, and it is easily drawn into wire. Its high cost prevents its use extensively in the arts.

GOOD HEALTH.

The Use of Salt.

We have received from a correspondent, says the London *Lancet*, a letter making some inquiries into the use of salt, and we are given to understand that, among other follies of the day, some indiscreet persons are objecting to the use of salt and proposing to do without it. Nothing could be more absurd. Common salt is the most widely distributed substance in the body; it exists in every fluid and every solid, and not only is it everywhere present, but in almost every part it constitutes the largest portion of the ash when any tissue is burned. In particular it is a constant constituent of the blood, and it maintains in it a proportion that is almost wholly independent of the quantity that is consumed with the food. The blood will take up so much and no more, however, much we may take with our food; and on the other hand, if none be given, the blood parts with its natural quantity slowly and reluctantly.

Under ordinary circumstances, a healthy man loses daily about twelve grains by one channel or the other, and if he is to maintain his health that quantity must be introduced. Salt is of immense importance in the processes unministering to the nutrition of the body, for not only is it the chief salt in the gastric juice and essential for the formation of bile, and may hence be reasonably regarded as of high value in digestion, but it is an important agent in promoting the processes of diffusion, and therefore of absorption. Direct experiment has shown that it promotes the decomposition of albumen in the body, acting probably by increasing the activity of the transmission of fluids from cell to cell. Nothing can demonstrate its value better than the fact that if albumen without salt is introduced into the intestines of an animal no portion of it is absorbed, while it all quickly disappears if salt be added.

If any further evidence were required it would be found in the powerful instinct which impels animals to obtain salt. Buffaloes will travel for miles to reach a "salt-lick," and the value of salt in improving the nutrition and the aspect of horses and cattle is well known to every farmer. The popular notion that the use of salt prevents the development of worms in the intestines has a foundation in fact, for salt is fatal to small thread-worms, and prevents their reproduction by improving the general tone and the character of the secretion of the alimentary canal. The conclusion, therefore, is obvious that salt, being wholesome, and indeed necessary, should be taken in moderate quantities, and that abstinence from it is likely to be injurious.

A DISCOVERY IN RELATION TO HYDROPHOBIA.—M. Pasteur recently made an interesting communication to the Paris Academy of Sciences in relation to canine madness. His experi-

ments had shown him that an injection in the region of the skull of the virus of rabies always produced the malady in an acute form, but that an injection in the veins only occasionally had acute results, being often followed by chronic affection only, without barking or ferocity. If a dog were inoculated with fragments of marrow or of nerve taken from a mad dog, the disease would be communicated. M. Pasteur further stated that he had rendered twenty dogs proof against the disease by inoculating them with other virus than the virus of rabies. Fowls and pigeons injected with the latter became affected, but soon recovered spontaneously. *London Standard.*

Strange Attitudes in Death.

Professor C. E. Brown-Sequard writes that at the battle of Williamsburg a United States Zouave was shot directly through the forehead as he was climbing over a low fence, and his body was found in the last attitude of life; one leg half over the fence, the body crouching backwards. One hand partially clinched and raised to the level of the forehead, presented the palm forward as if to ward off an approaching evil. A brakeman of a freight car on the Nashville and Chattanooga Railroad was instantaneously killed by a shot between the eyes, fired by a guerrilla. The murdered man was screwing down the brake at the moment of the shot. After death the body remained fixed, the arms rigidly extended on the wheel of the brake. The pipe which he had been smoking remained still clasped between his teeth. The conservation of the last attitude can take place in other circumstances than sudden death from wounds to the brain: the heart or the lungs, although an injury to a vital organ is the most frequent cause of that phenomenon. A detail of United States soldiers, foraging near Goldsboro, N. C., came suddenly upon a party of Southern cavalry dismounted. The latter immediately sprang to their saddles and, after a volley had been fired at them, they all but one rode away. That one was left standing with one foot in the stirrup, one hand, the left, grasping the bridle rein and mane of his horse, the right hand clinching the barrel of his carbine near the muzzle, the butt of the carbine resting on the ground. The man's head was turned over his right shoulder, apparently watching the approach of the attacking party. He was called upon to surrender, without response, and upon a near approach and examination he was found to be rigid in death, in the singular attitude described. Great difficulty was experienced in forcing the mane of the horse from his left hand and the carbine from his right. On the battlefield of Beaumont, near Sedan, in 1870, the dead body of a soldier was found half sitting, half lying on the ground, delicately holding a tin goblet between his thumb and forefinger and directing it toward an absent mouth. While in that position the poor man had been killed by a cannon ball, which had carried away the whole of his head and face except the lower jaw. The body and arms had been suddenly seized at the time of death by a stiffness which produced the persistence of the state in which they were when the head was cut off. Twenty-four hours had elapsed since the battle.

The Mobility of the Brain.

It has long been known that the brain in normal conditions undergoes certain rhythmical movements. The powerful vessels at its base cause the cerebral mass to rise and fall with each systole and diastole of the heart. The brain also rises slightly with each expiration, and sinks with inspiration. These phenomena are dependent, it is presumed, upon the presence of the cerebro-spinal fluid, since, when that is withdrawn, the movements cease.

M. Luys, in a paper recently read before the Academie de Medecine, states that the brain is subject to still other changes in position, dependent upon the attitude of the body. If a man is in the dorsal decubitus, or lies upon his side, or stands upon his head, the brain undergoes certain corresponding changes in position in obedience to the laws of gravity. The movements take place slowly, and the brain is five or six minutes in returning to its first position.

From these anatomical data M. Luys deduces some striking conclusions of practical interest. He explains, upon the theory of these gravitating movements, the symptoms of vertigo and faintness, which feeble persons experience when suddenly rising from a horizontal position. He asks if the pains of meningitis are not due to an interference with these normal movements. In cases of insanity he calls attention to the excitability and agitation which often come on when the patient lies down at night. As a practical points in mental hygiene, M. Luys advised against prolonged travel during most of the day, and urged the value of giving the brain the change produced by a horizontal position at night.—*The Medical Record.*

BLINDNESS is steadily decreasing in England, owing, it is considered, to the advance in surgical treatment of the eyes, and to the decline of such diseases as small-pox, etc., among children. For thirty years this affliction has gradually lessened, but within the last decade the improvement is specially noticeable and the last returns reckon some 22,832 blind persons—about one in every 1,138.

MINING SUMMARY.

The following is mostly condensed from journals, published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Inyo.

THE MODOC CON.—Inyo Independent, May 16: This company has 19 men at work at the present time. At the furnace there is on hand 729 tons of ore and at least 60 tons in the chute. Supt. Frank Fitzgerald has just let a contract to John Schober to burn 16,000 bushels of coal, and to cut 55 cords of wood. He has a force of 20 men, burning, chopping, etc. The wood is nearly all in and as soon as 6,000 bushels more of coal is delivered operations will commence, for a "50-day" run or more. As the coal will all be in by the 13th, everything will be ready to start on the 21st inst.

DEEP SPRING DISTRICT.—Mr. P. A. Chalfant came in from Cottonwood creek, Deep Spring district, Thursday last, to which place he will return again in two or three days. He informs us that the Greenly mill is about ready to start up, and that the prospects generally in that region appear to be particularly encouraging. Also that the Montezuma furnace material is now all on its new site at Antelope Springs, where it is to be re-erected immediately under Mr. Bray's superintendence.

Mono.

STANDARD CON.—Bodie Free Press, May 19: Employed during the week twelve miners and one watchman at \$4 per day. There has been a very marked decrease in the flow of surface water during the week. Will be able to resume milling some time next week. South drift No. 1 from south winze No. 2, from 385-foot level, has been run 12 ft; total length, 50 ft, showing 1½ ft of milling ore. North drift No. 3 from main west crosscut has been advanced 13 ft; total length, 141 ft, vein, 3 ft wide. South drift No. 4, from east crosscut No. 2, is in 105 ft; progress, 13 ft, showing 2 ft of vein.

BODIE CON.—Upraise No. 1, 800-foot level, has gained 15 ft. There is no improvement to note in the grade of the ore. Upraise No. 4, 300-foot level, has gained 11 ft; total height, 58 ft, with no change to report. Upraise from 770-foot level shaft level, has gained 6 ft; total, 54 ft. The ledge here is 3 ft wide, and shows some improvement. At the Bodie Con. mill there was crushed 150 tons of ore. This ore is from the 550 and 770-foot levels of the Lent shaft. At the Bodie Tunnel mill there were crushed 342 tons, mostly from the Vulcan vein. The average assay value of the pulp is \$26.31, and of the tailings, \$2.56.

BULWER CON.—Employed three men at \$4 per day. The south drift from the west crosscut No. 2, 500-foot level, has been run during the week 12 ft; total length, 240 ft, showing about 15 inches of vein in the face.

GOODSHAW.—The Goodshaw mine was closed down last week for the present. They contemplate making improvements and putting on a large force of men next month.

BODIE TUNNEL.—North drift, 200-foot level, the vein is 2 ft wide of free milling ore. At the expiration of the Bodie lease the Bodie Tunnel will continue running the same.

Nevada.

A RICH DISCOVERY.—Foothill Tidings, May 16: For several days a few Portuguese have been sinking on the croppings of a very large ledge in Pleasant Valley, on the south side of the road, a few hundred yards below Rapp's place. The shaft is down about 18 ft and the ledge is from 18 inches to two ft in thickness. Several hundred dollars have been taken from the quartz so far, and none of it has yet been crushed. The rock is exceedingly rich and seems to improve as depth is obtained. A gentleman who was there on Sunday says he saw the men pick about \$60 worth of gold out of the quartz with a pen-knife.

CON. PLANET DRIFT GRAVEL MINE.—A letter received yesterday from the foreman of the Planet states that the tunnel is progressing finely, the work being in slate which works well and stands without timbering. The cost per foot now is only about four dollars. The tunnel is large enough for a locomotive, and one will be ordered and ready by the time the channel is reached. This is one of the most valuable properties in California, and is managed in a way that insures justice to the small as well as the large stockholder.

THE MAGENTA MINE.—This morning the Magenta company started men to work on the drain tunnel. The tunnel will have to be run a distance of about 644 ft before it reaches the main shaft and the work will be in 8 hour shifts, and will be pushed forward as soon as possible.

PEABODY MINE.—The Peabody mine is now looking better than it has ever looked, and the owners have just cause to rejoice, for the prospects are indeed very fine. A recent crushing of ten loads of quartz from the Peabody gave a yield of \$24 per load. The ore now being taken out is very rich. That quality shown us to-day by Supt. Jas. Bennallack, will yield \$250 per load. There is a six-inch ledge where this rich ore came from. The shaft is now down 250 ft, and in another week a new station will be started. The company are employing ten men including trippers, and are cross-cutting. The ledge now being worked is the regular Peabody ledge and not the Rhodie Island Ravine ledge, the latter one having been lately run on by the company. To say the least, the prospect at the Peabody is very encouraging, and Mr. Bennallack says that he has no doubt but that there will be forty men at work there within one month. The shaft is 80 ft below the prospect level, and there is a drift of 400 ft underground.

Plumas.

HALLSTEAD MINE.—Phinas National, May 16: From Mr. J. S. Jaquith, who last week visited the Hallstead mine, we learn that nothing new is to be noted. The ledge still continues to justify the high expectations concerning it, and is widened both laterally and perpendicularly. The ore prospects well for the whole sixteen ft in width of the ledge. Some hard rock is found at the western end, but nothing to detract from the value of the mine.

MINING NOTES.—Work has been resumed at the Mills shaft. The Loring & Leavitt mine at Elizabethtown has been put in first-class shape, and the owners will start their new shaft on Monday next. The boys on Mill creek have got on to a good lead of black, rusty gold. They are getting fine prospects, as much as \$5 to a tub. The drifting was carried so near the bank of the creek that it caved on them and they will have about 100 ft of flume to put in before they can push along much. The Bell's Bar Company have decided to sink a new shaft not far from the old one; work will be commenced immediately. The Consigne Gold Mining Co. are in with their tunnel some 1,600 ft. They have recently run 32 ft in hard blasting rock, but the Supt., Charles Hanson, expects to soon get through it and has high hopes of the mine. He is having a new road made from the Bear Pen to the Company's mill that will materially improve the facilities of reaching the latter. Riverdale is running smoothly, with good prospects and pitching bedrock.

MCLLELLAN.—Greenville Bulletin, May 16: One of the most promising mining prospects around here is the McLellan owned by McIntyre and McIntosh. This was one of the first claims worked in the district, more than 20 years ago. Near the summit of the mountain, and at the surface of the ground, Henry C. Bidwell and John Waterworth. These parties made no effort to develop the mine after the surface ore was worked, and the claim was abandoned and remained untouched for many years. Recently it came into possession of the present owners, and these have already done a good deal to develop it. Three tunnels have been run at different elevations; No. 1 the ledge is opened 30 ft; No. 2 has yet to be run 80 ft before it will reach the ledge, and in No. 3 it is exposed for a distance of 500 ft. From the level of No. 1 a depth of fully a thousand ft of backs would be gained, and the existence of the ledge all of that depth is demonstrated. The mountain is exceedingly steep, the ledge runs at nearly right angles to the surface, and all the way up is found after running a short distance by tunnel. The ore has been prospected by experts again and again, samples being taken from all accessible points. The results in every case were satisfactory. The value of this claim is so clearly established that parties have offered the owners to build a mill for an interest in the mine but the offer has not yet been accepted. A most advantageous mill site is found just below the lower tunnel. Water power can be had from the Round valley reservoir, and the ground is thickly covered with choice mine timber. The McLellan could easily be developed into a valuable mining property.

A BIG FIND.—Sierra Tribune, May 15: J. P. Hall, who formerly resided in this county and was at one time manager of the Good Hope mine, from all accounts made a lucky find in the quartz line at Greenville, Plumas county, a couple of weeks ago. Since the early mining days of that district it was supposed that a rich ledge crossed near the head of Taft ravine. Thousands of dollars were expended by prospectors in hunting for the ledge, but it was not found, and the search was given up years ago. The Bulletin gives the following account of the discovery: "Mr. Hall had often heard the old miners speak of the rich rock found in the ravine, and when coming down the mountain last fall from the Ophir mine owned by him, looked over all the ground where the prospecting had been done. Some distance down the mountain he noticed several shallow holes from which the quartz had been thrown out. This led him to think that if the tunnel was in bedrock, the ledge must be between these holes, and it was. A couple of weeks ago he went to work in one of the holes mentioned, and after getting the snow shovelled out started to run a cut up the hill. Near the surface rich float-rock was found, and in a few hours he struck what he believes is the long sought ledge. At the point of discovery it is seven ft wide. Surveyor Higbie has no doubt that it is a permanent ledge, and the one so much prospecting was done to find. Several old miners have examined the ledge and all are firm in the same belief; several have also made proposals to buy interests in the claim, but Mr. Hall has refused to sell till he shall do some more development. He has means to prospect the claim thoroughly."

Sierra.

A GOOD STRIKE AT THE HOMESTEAD.—Sierra Tribune, May 15: A strike was made at the Homestead quartz mine some time ago that has not been mentioned in the newspapers before. As our readers are aware this mine is located on Rock creek only a quarter of a mile or so distant from the Ruby gravel claim. Stephen Spencer and others purchased the mine a couple of years or more ago from an old prospector, who goes by the name of "Quartz" Johnson, and proceeded to build a ten-stamp mill, run a tunnel and otherwise develop the property. The tunnel run tapped the ledge 60 ft below the surface and a shaft that had been sunk by the former owner. Last season Mr. Spencer found indications of gravel and came to the conclusion that a channel coursed through the ground. This led to the starting of another tunnel in the fall, down by the mill. Work was carried on in that quarter all winter, and after running some 500 ft a four-foot vein of quartz was crossed. An east drift was immediately started along the vein and at this writing has been run 30 ft. At this point, which is 200 ft below the old workings, the ledge is even stronger than above, showing some fine ore. The party who gave us this information had a couple of pieces of rock that came out of the new tunnel and they were as rich specimens of gold bearing quartz as out reportorial eyes have feasted upon for some time. A clean-up was recently made in the mill after a couple of months run on ore taken from the upper stopes. The yield was very satisfactory. There is now every evidence that the Homestead will soon become a leading quartz mine.

ENCOURAGING PROSPECTS.—J. T. Bradbury has struck ore in the Spohm ledge that prospects first-rate in free gold. This claim is located on Kanaka creek, something over a mile below the Rainbow mine. A number of years ago the ledge was worked quite extensively and yielded quite an amount of very rich ore. For a number of months past "Brad" has been engaged in running ahead the main tunnel and is now making a connection between the old stopes for the purpose of getting better air.

WORK TO START UP.—T. Ellis, who is one of the owners in the Arizona mine, was over from Forest City this week and informed us that the Company would resume work in the tunnel next month. It will be run by contract. The tunnel is now in slate

rock having been run 700 ft. The Company hope to strike gravel in three or four hundred ft further ahead.

PIKE CITY.—Mountain Messenger: The Alaska shaft is full of water. Two tanks are fixed for bailing, 50 inches coming out. Steam pumps will be put in as soon as water is sufficiently lowered. Two boilers have been set. Two more are being put in place—250 horse power, more than had previous to the fire. J. H. Bates one of the heaviest stockholders, expected to soon arrive from the East, when the development of the mine will be resumed. Supt. Davis still in charge of affairs.

ALLEGHANY.—Joe Stephens, of Sierra City, is expected to arrive here this week to put four men to work on Hauber's ledge in the interest of Supt. Deidesheimer, of Sierra City. The croppings of this ledge are very rich. Doc. Bowers is stopping at the Golden Gate quartz mine; W. N. Hooper has the property in charge. The main tunnel of the Rainbow is in over 1,100 ft, to tap the ledge about 400 ft below the old works, 2,400 ft in all to run, 45 to 50 ft to make a week, 16 men employed. One air compressor and two Burleigh drills used. Ledge is expected to be struck by the 1st of Nov., and the mill will probably be running by next spring. W. F. Hanley is now Supt.

Shasta.

BUCKEY.—Cor. Redding Independent, May 6: Miners appear to be doing fairly well this season. Messrs. Wilcox and Cochran have been hunting "pockets" with good success. They have taken out over \$800 worth of gold within two weeks, with still more prospects ahead of them.

SILVER.—Shasta Courier, May 16: James Brindard, this week, brought in a sample of silver ore from a ledge discovered by Lowery, between the Gage place and head of a gulch, which puts into Olney creek, which assays here show \$84 per ton. That neighborhood is rich in minerals. The Churntown and Buckeye miners never have, nor now propose to allow Chinamen to work the mines of those districts, and all attempts to introduce the Mongolians there fails.

Siskiyou.

NOTES.—Yreka Union, May 16: From Mr. Brown we learn that they recently crushed 18 tons of rock from the Bonanza which yielded nearly \$300. Miller & Mallow crushed 25 tons of rock from their mine which went \$72 to the ton. Sorenson has out about 40 tons of good rock, which will be crushed at Vacant's Mill. Mr. John Steward has out about 35 or 40 tons of rock which will go \$20 to the ton. All of the placer miners are at work with good prospects. At Hamburg Bar quite a number are making preparations to go to work in the river as soon as the water goes down. Mr. W. Kittelwood will go into the Klamath below the mouth of Scott river as soon as the high waters recede.

Trinity.

DEADWOOD DOINGS.—Journal, May 16: Quartz mining in Deadwood District is fast becoming one of the leading industries of the county. McDonald & Franck are now putting up a five-stamp mill and R. N. Davidson has just received a cannon-ball mill which will be put in operation without delay. All the mines now being worked there are reported as doing well, and the gold yield from that District will materially increase the produce of the county for the current year.

Ventura.

EXCITEMENT ON THE PIRU.—Ventura Democrat, May 15: A scene very familiar to our eyes greeted us Tuesday morning in front of Corey's store, Main street. It was none other than an excited crowd surrounding a brace of solemn visaged burros, packed with shovels, picks, pans, blankets, grub and all the usual paraphernalia pertaining to a modern mining outfit. Upon inquiry we learn that Messrs. Snuffin and Castano, citizens of the Santa Paula section, had brought to town the day previous several specimens of fine looking silver ore which were exhibited to some of our energetic and impulsive citizens, hence the commotion. Messrs. Wm. Williams and Witherell had started for the scene of discovery the evening before, and Messrs. Hall, Vickers and Harley were with loaded donkeys, ready to take the road for the same destination. If the favorable reports are confirmed by those gentlemen, the Piru country will doubtless witness a rush for its hidden treasures. The ore was found on the summit and at the eastern extremity of Pine mountain, between the Piru and the Sespe. The ledge from which the specimens were obtained is said to be from six to ten ft wide and traceable by its croppings for a mile or more. The existence of the precious metal in the Piru mountains has long been known and it seems to be an undoubted fact that in this locality, instead of Sutter's mill, was found the first gold discovered in California and that Francisco Lopez, is entitled to the distinction of first discovery, erroneously conferred upon Marshal. Lopez learned of the existence of gold there, from the San Fernando Indians and utilized the information thus obtained by digging it and selling his nuggets to Los Angeles traders as early as 1837.

NEVADA.

Washoe District.

COMBINATION.—Enterprise, May 16: The shaft has reached the 2900 level, where they are putting in a pump tank and making preparations to lower the Cornish pump to said point. At this depth a station will be made and a drift started west. This drift will drain all the ground above the 2900 level.

BEST AND BELCHER.—Good progress is making in the two east crosscuts on the 1200 level, and the formation is of a promising character. On the 2700 level the north drift still continues in material that shows some metal. The rock has a very lively and "kindly" appearance.

SIERRA NEVADA.—The northeast drift has been advanced about 20 ft. It has passed into a new and peculiar formation which promises well. The diamond drill is still running in west crosscut No. 2. It shows that there is very little water in that direction.

UTAH.—The southeast drift on the 1950 level has been extended 35 ft, and continues in vein material similar to that found in the north drift on the same level; that is, a mixture of quartz and porphyry.

OPHR.—Are still finding some low grade ore in the filling of the old drifts and other openings on the 250 level. The ore extracted is being worked at the

Morgan mill on the Carson river.

YELLOW JACKET.—The old upper levels continue to yield well in the usual character of ore, keeping the river mills at work. The prospecting operations disclose low grade ore at several points.

MEXICAN.—Have made 11 ft in the winze below the 3000 level this week. The ground is perfectly dry. At the present rate of sinking the winze will soon reach the 3200 level.

SAVAGE.—Are constructing a stone bulkhead in the north drift on the 2600 level. This bulkhead will be placed at a point about 40 ft back from the face of the drift.

GOULD AND CURRY.—Are waiting for the water to drain out of the southeast drift on the 2700 level. The water is decreasing, but it still make the drift very hot.

CALIFORNIA.—The usual progress is making in the east drift on the 2900. The repairs to the C. and C. joint shaft are still continued.

HALE AND NORCROSS.—Are taking out ore from the 200 level through the old F street tunnel. Work on the 2800 has not yet been resumed.

BELCHER.—All work in the old upper levels is going on about as usual. Ore enough being extracted to keep the mills in operation.

CON. VIRGINIA.—The east drift on the 2900 level has been extended about 30 ft. Are still repairing the C. and C. joint shaft.

UNION CON.—West crosscut No. 4, recently started is out about eight ft. As yet it shows no change of formation.

ALTA.—Are still drilling west on the 2150 level, and making repairs to both the east and the west drifts.

ANDES.—A considerable amount of prospecting is being done and some low grade ore developed.

UNION SHAFT.—Are still repairing the drain drift connecting with the Suro tunnel on the 1600.

CROWN POINT.—The usual amount of ore is being extracted, and the mills on the Carson river are kept running to their full capacity.

Arabia District.

AT WORK.—Silver State, May 16: The mining outlook in the southwestern part of the county is brighter than it has been for some time past. Deputy Assessor Buckner says there are eight or ten miners at work on a mine in Arabia district, west of Oreama, taking out base metal ore, which are being shipped to Fairbairn to be smelted. At the Humboldt Queen mine, near Rye Patch, several miners are employed extracting ore, the richest of which is being shipped to Denver for reduction.

Belmont District.

DOUBLING CAPACITY.—Belmont Courier, May 17: Superintendent N. C. Fassett informs us that the Belmont Mining Company has decided to enlarge the leaching works to double the present capacity, and that the additional tanks, etc., have been purchased and will soon arrive here. Men are now at work on the building and it will not be long before the works are ready for use. A long and profitable run is confidently expected. The Belmont mine is looking better and better as the work of development advances. The ore extracted from the 200 foot level south carries rich chloride and black metal. The prospects are certainly good.

Battle Mountain District.

COPPER.—Battle Mountain Messenger: The Duchess Smelting Co. have purchased the Copper Queen mine, situated in Old Battle Mountain mining district. From W. H. Taber, President of the company, and A. J. Kallston, their business manager, we learn that a small force of men will be put to work on the Copper Queen next week to test its merits, and if it prospects favorably, as is anticipated, a new 60-ton copper furnace will be erected some place in the vicinity of the mine.

Central District.

RED ORE.—Silver State, May 16: In Central district several miners are at work, and at least two mines—the Railroad and Locomotive—are looking well.

Eureka District.

GEDDES.—Eureka Sentinel, May 16: Supt. R. D. Clark, states that, under instructions from his company, he will resume work in the Geddes mine immediately. For the present only seven or eight will be put on, who will be employed to do dead work. As soon as the roads improve sufficiently, a large supply of wood and salt will be hauled in for use at the reduction works. After some preliminary work is done, and the way cleared for thorough exploration and ore extraction, a large force will be put into the mine. When the leaching works start up, it will be to run a good long while without stopping, for it is the plan to start up with a good ore reserve, and to work the mine for everything that is in it. And, as everybody is convinced, it is a big mine.

Jefferson District.

RESUMED WORK.—Belmont Courier, May 17: We learn from J. J. Hayden that the Harrison Brothers have resumed work on their mining property at Jefferson and that they are extracting good paying ore. The little mill is now running on ore from their mine. Mr. Hayden also informs us that Charles Kanroth is running his leaching works on ore from the Jefferson Carbonate mine. The ore is of an excellent quality. Work on the Cora D. mine, at Jefferson, is being prosecuted with energy, and this property is looking well. We have seen several specimens of ore recently extracted from this mine; they all carry rich chloride. Free gold is also plainly visible in this ore.

Mount Cory District.

LOOKING UP.—Walker Lake Bulletin, May 14: As has been often predicted, mining matters are looking up, and the camp will soon be active. Some prominent Hawthorne capitalists run up here last week, looking at the North Star mine. Although the camp is looking up, there are plenty of men here, and men out of employment are not needed. The Coeur d'Alene excitement has died out. Coryville people will do their stampeding around among their home hills. The road from the mine to the mill is in excellent order, and the ore teams make their trips with the regularity of railroad trains.

Spring Valley District

OPENING A LEAD.—Silver State, May 16: At Spring Valley L. F. Dunn is opening up a lead

which promises to rank among the best in the county. Deputy Sheriff Anderson, who was down in that vicinity a few days ago, says the lead is very large and carries from four to six ft of ore.

Star District.

ORE.—Silver State, May 16: In Star district, the Grizzly mine is being worked, and is producing considerable ore that works from \$500 to \$1,000 per ton.

Ward District

ORE.—Ward Reflex, May 16: O. M. Converse, who has the contract, commenced hauling ore to the Monitor mill Sunday. The Argus teams will commence hauling in a day or two.

ARIZONA.

Mohave.

DIFFERENT DISTRICTS.—Mohave County *Miner*, May 16: Men are working on the Constellation mine, near Cerbat. Superintendent Moses is pushing work on the Starke and Ewing mine day and night. Among the numerous transfers of mining property recently made we notice the sale of a one-half interest in the Prince George mine at Stockton Hill from Caldwell Wright to T. J. Christie. The sale was made May 6th for the consideration of \$8,000. Mr. Christie has already put four men to work on the mine for the purpose of extracting some of the high-grade ore for which the mine is noted and of which there is a large quantity now in sight. Goin's pack train is at work in Maynard district. Work has commenced on the Deen mine at Wallapai mountain. Four men have been put on as a starter but double that number will soon be employed. Frank Hamilton has recently shipped about 3 tons of very high grade ore from the Mariposa mines at Wallapai mountain. He is now working on the Mississippi, an adjoining and equally valuable mine. Messrs. Little and Colman, who have been working on the Wallapai Chief mine in Maynard district, have suspended operations for a time. W. Richards, J. Corin, Pemberton and D. Parks, are getting out lots of gold ore from the American Flag mine. Woods' pack train will commence taking the ore from this mine to the Kingman sampling works next week. Chas. Roe, of the firm of Roe Bros., B. J. Elliott and J. F. Luthy have leased the five-stamp mill at Cerbat, belonging to the Arizona Northern Mining Company, for one year and have already commenced to put it in running order. They propose to work custom ore at reasonable rates. J. M. Quine has three men at work on the Hunkidori, near the Lone Star mine. In sinking a 30 foot shaft on the vein he has accumulated several tons of fine-looking ore, which goes from 10 to 15 ounces in gold to the ton. The ore streak is about ten inches in width. Good miners are greatly needed in the Wallapai district. It costs about one-half what it did two or three years ago to live in Mohave county, and miners' wages are still \$4 per day, and yet good miners are scarce. Frazer McCleod has sold the Storm Cloud mine on Potts' mountain, Owen district, to N. W. Clark and J. K. Maddock. Yeacham and Siebrecht have sold 750 feet of the New Year, Eagle and Orient claims to the Ferguson boys for \$750. These are gold ledges in the Gold Basin district.

BONANZA MINES.—Quijota Prospector, May 16: Owing to the absence of the superintendent at Tucson during a portion of the week, we are unable to get our usual complete reports of work on the mines. Tunnel No. 1 is 176 ft deep in softer ground. Crocker tunnel is in 174 ft and looks exceedingly favorable, the winze is being pushed forward as fast as possible. The Peer tunnel is about 160 ft deep, making great progress in softer ground. The well borers have finished their work. The company consider they have ample water for all purposes.

THE SOUTH QUIJOTA RANGE.—The north end of the south Quijota range lies about seven miles south of Quijota by a good wagon road. In a direct air line it would probably measure about 4½ miles. This range of mountains has attracted more or less attention for the past six months, owing to the fact that some rich ledges of black sulphure ore have been discovered there. A few days ago a Prospector representative, in company with C. L. Tisdale, visited the northern end of that mountain, for the purpose of prospecting it thoroughly, and after three days of hard toil failed to discover even a trace of anything mineralized. The north end of the range is a burnt up malpais, which, as every prospector knows, never carries mineral. A little range of foot hills that start to the west of Ben Nevis, running in a northerly and southerly direction, has the same character of formation as the above mentioned mountains. Owing to the scarcity of water in the south end of the Quijotas, that section was not visited.

OLD DOMINION COMPANY.—*Globe Chronicle*, May 16: One day this week—the 15th—two furnaces of the Old Dominion Co. turned out 32,860 pounds of copper. This is the largest run ever made anywhere by furnaces of only 30 tons capacity. The quality of the ore now being taken out of the Old Globe mine—and there is an enormous quantity of it in sight—is of such a high grade, and so easily smelted, that it is confidently expected that the output for this month will be the largest ever made by the company. The supply of coke keeps up, about 100 tons having passed through the town this week. As near as we could calculate we judge that the company shipped about 150 tons of bullion this week. A new 9x15 rock crusher has arrived and is being put in place; also a large steam pump for forcing water from the furnaces to the mines, a distance of about half a mile. The two furnaces now in operation require about 6,000 gallons of water daily. Heretofore this has, after performing its mission, been wasted; now the steam pump will force it into tanks erected for that purpose at the mine, and it will be used for the operation of the hoisting works and the diamond drill.

GREEN VALLEY.—We learn that there is a new quartz mill going into this valley, which will make the second one there. The rich developments made in this quarter in gold is drawing the attention of careful and prudent miners, and it promises to be one of the richest gold fields in Arizona. The new mill is at Winslow, in transit to Green valley, and is of ten-stamp capacity. We also understand that preparations are being made to build a railroad through the timber belt from Flagstaff to the Rim Rock. We are unadvised if this contemplated road is part of the Mineral Belt, or whether it is simply an enterprise of parties desiring to reach the fine timber for lumber purposes.

COLORADO.

NOTES.—*Georgetown Courier*, May 13: The lessees on the Pay Rock are said to be doing splendidly. A recent run of ore from the Pelican Dives gave 300 ozs. silver per ton. One hundred and twenty-five men are employed on the Freeland mine and smelter. Husted & Co., who are driving a tunnel on the Windsor lode, at Empire are in 90 ft. They have a good streak of scattered ore. The snow on the mountains is still preventing miners from doing the usual amount of work. Many idle properties at Empire and Dumont are to be started up this season, and both of these camps promise to be lively. Sixty-four tons and 644 pounds, net, were shipped from the Mendota mine last month. The total value of the same was \$4,408.83. Recent mill runs of ore from the Shively mine went 600 and 900 ozs. silver per ton. Quite extensive work will be done on this mine during the coming season. The recent strike in the Summit mine holds out well, while the ore increases in richness. A great deal of ore is being opened up, which runs very high. Very encouraging reports come to us from the Coin lode, on Brown mountain. In the slope above the lower level, westerly, a fair streak of ore has been encountered of which a mill-run of one ton was had last week, running, 1st class, 477, and class, 152 ounces silver per ton. Exceedingly rich gold ore was struck in the Centennial mine, within the limits of Georgetown, on last Saturday. A fine streak of ore was opened up at quite a depth an assay from which returned as high as 16 ounces gold 63 ounces silver per ton. An assay on ore from another portion of the mine went 428 ounces silver. The Vulcan mine, on Republican mountain, is working a force of 30 men. It is owned by Meyers Bros. and Pollard. On the Meyers lease, west of the main level, an ore streak ranging from one to eight inches in width, averages, coin value, 400 ounces silver per ton.

IDAHO.

CARBON CENTER.—*Coeur d'Alene Pioneer*, May 16: The new camp of Carbon Center is located at the head of Beaver creek—seven miles southeast of Beaver city. It is in the center of a flat basin which is fringed by high mountains. The site is a beautiful one, and from the developments made in the surrounding hills, Carbon promises to become a camp of no little importance. A good trail connects Carbon with Beaver, and there is good feed along the way. Quite a number of houses are already up, and building is progressing as fast as material can be procured. A large hotel is now in course of construction. The mines about Carbon are distinctively base, and there is no question but that they are on the galena belt passing by the head of Granite creek and over on to Butte creek. The ore about Carbon is mainly argenteriferous galena of good grade, but red carbonate has likewise been found. Every variety of galena is represented, and the ore has a general appearance of existing in a good, solid formation. Specimens brought in last Tuesday show black sulphurets, ruby and galena. The principal locations are the Virginia, Sunset, President and Rainbow. On the Virginia fifteen men are at work, and supplies are being packed to the mine. The vein is over seven feet wide, over half of which is solid metal. The Sunset is a strong vein of galena, but the snow on the location has retarded operations until the present time. It promises to be one of the banner mines of the camp. The President is a five-foot vein of carbonate and galena, which assays \$300 per ton. The Rainbow is mostly carbonate ore of good grade, but work on it has only just begun.

THE PROSPECTS.—*Coeur d'Alene Pioneer*, May 16: We may say without fear of contradiction, that for the amount of development, the prospects of the Coeur d'Alene country was never equaled by any other camp in the United States. The quartz recently discovered on Reader gulch is practically inexhaustible. There are thousands of tons above the grass-roots, and every ounce of it contains pay. We have an inexhaustible supply of fuel and water, so that ore can be worked cheaper than elsewhere. There is every reason to believe that each stamp will yield a greater profit here than in the Black Hills, and yield it for a longer time. We might say without exaggeration that the mountains are pay quartz, in much of which gold can be plainly seen. There will be more stamps in the Coeur d'Alene within five years than in the rest of the Union.

THE GALENA BELT.—We have in previous issues called attention to the fact that the discoveries of base ores in the Coeur d'Alene country is worthy of a share of the attention now bestowed on the gold interests. It is certain that galena and carbonate ores exist in this range in large quantities, and that it is of a paying grade. The mines are being developed rapidly, and we believe that they will ultimately be proven to be on one of the richest and most extensive base metal belts ever discovered. There is about Carbon, at the head of Beaver creek, extensive bodies of rich argenteriferous galena, which lay in well-defined ledges and in a steady formation. The series of mines extend northwest, and can be traced on to the head of Granite creek—a tributary of Pritchard. If we follow the flow of the belt we strike Butte creek, upon which good galena has been found. The character of the ore is so similar that it is reasonably certain it is the outcroppings of an extensive galena deposit which underlays that entire strip of country. The trend of the belt would cause it to cross by the heads of both forks of Eagle creek, and on to the sources of the north fork of the Coeur d'Alene river. We venture to predict that rich galena will be found in these localities, and in the end the mining of the base ores here will be as important a branch of the mining industry as the development of the gold interests are now.

ITEMS.—*Coeur d'Alene Pioneer*, May 16: Every side gulch where bedrock has reached contains good pay. The total output of Dream gulch to date is nearly \$12,000. The ditch from Alder creek is being dug. Work on the Mother Lode will be begun just as soon as the high water will permit. A tunnel will be run in on the ledge. The Lehi shaft is down 60 ft, and the ore body shows as well as ever. Ten men are still at work, and considerable ore is on the dump. The hills between Eagle creek and the North Fork contain extensive gravel deposits which will pay to hydraulic. The most extensive hydraulic diggings on the continent are right about us. The Star lode, within a stone's throw of Raven, is looming up as a big mine. The vein is of unknown

extent, but enough is in sight to warrant the Badger State Mill Co. in putting in a stamp-mill. There is no longer any doubt that one of the main channels of Pritchard creek has been tapped by the drain-ditch on the Butte claim. The gold is the coarsest yet found on the creek, and meets the fullest expectations of those interested in this development. The Margaret lode on the west fork of Eagle creek is opening up beyond the most sanguine expectations. The ore is of a peculiar nature, being in the transitory state between the base and free-milling varieties. The Margaret is full 15 ft in width, and averages clear across \$30 per ton. Development work is still progressing, but the present month must see its close. With the advent of the coming month the results of the labor bestowed in preparing the many claims for sluicing will be apparent. Those who have been sluicing on low bedrock during the past week have been compelled to move up. The warm weather has swollen the creeks to double their former volumes, and several tail drains have been carried off by the high water.

COEUR D'ALENE.—*Idaho Statesman*, May 16: The excitement with regard to the Coeur d'Alene mines seems to be quieting of late. Hundreds are still going in that direction from all quarters, but the hope of realizing "big strikes" in a short time is not so strong as it was during the winter when the deep snow covered the country and everything was left to the imagination. That there are some good mines in that region there is no reasonable ground for doubting, and it is quite possible that the country will prove worthy of occupation. Most of the adverse things that have been said have been inspired by the sensitive jealousy of the older mining camps through a fear of losing a portion of their local population. This, however, has had but slight effect in checking the onward march of the prospector, who will be always ready to try his fortune in a newly-discovered camp. The country in which the mines are located is large enough to furnish an abundant field for the gold-seeker, with as good chances of success as elsewhere.

PROSPECTING AT WOOD RIVER.—*Ketchum Keystone*, May 16: Although the snow has not yet fairly left the north hill sides, there are many prospectors going into the hills, and accounts of new and rich discoveries begin to reach us. It is not unreasonable to suppose that the prospecting season of 1884 will do more towards the development of Wood River's vast hidden mineral resources than all of her previous history has done. The reputation gained abroad for this country is very great and encouraging, and the number of immigrants already arriving daily indicates a very great influx. The more inhabitants we have the more prospectors, and, consequently, the more probable development of our mineral wealth. It is safe to say that were the number of prospectors now in the Coeur d'Alene region to invest Wood River, the world would be astonished by our wonderful developments and great riches. It is an old and erroneous custom that leads people to estimate the mineral worth of a country by its known discoveries and operations without any consideration whatever of its population. Wood River, but very sparsely prospected heretofore, bids fair to experience a moderate searching this year and we venture to assert that its importance as a silver mining region will be increased 100 per cent in the next six months. Lodes are being discovered everywhere now where heretofore it was thought nothing could exist and prospectors passed by in contempt. But the art of searching exclusively for croppings has passed away and the more scientific mineral seekers perplex the community by taking a spot of peculiar contour or a gopher hole for the starting.

A RICH STRIKE ON EAST FORK.—The news came through reliable miners from East Fork of Wood River yesterday that Messrs. Dunkey and Hillebrand have struck a rich blind ledge about half a mile from the North Star mine in line with that ledge and six miles due east of Ketchum. The ground there has been carefully prospected heretofore, but the lucky discoverers made their strike from very small pieces of float traced to a gopher hole, where operations were begun. They have cut into the hill a distance of about 20 ft and fine the surface ground full of large chunks of high grade galena. It is in a black slate formation and supposed to be but the break over of a large ledge that will very probably be encountered at the contact of this slate with a porphyry formation about 50 ft distant from the discovery.

THE SNAKE RIVER PLACERS.—*Idaho Statesman*, May 16: Mr. Cheesbro, who was largely interested until recently in placer mining on Snake river, has sold his interests to a company of Rhode Island capitalists, who will work these mines on an extensive scale. The company intends to build a dam across Snake river at a point some nine miles above Walter's ferry and construct ditches on both sides of the river. The mining ground which Mr. Cheesbro sold lies on the south side of the river just below the Silver City stage road and near the ferry; but the ditches to be constructed will cover good mining ground on each side of the river from their initial points to the ferry and for several miles below. Mr. Cheesbro informs us that the method now being adopted for saving the fine gold in these placers is to abandon the use of flates and quicksilver and leave the gold with the black sand. This is done by the usual process of washing and the use of concentrators. The black sand, thus concentrated, holds every particle of the gold and will average for most of the claims on the river about \$1,000 per ton. In this form, the product of the mines will be shipped to Omaha for reduction, where the black sand, which is nearly pure iron, is in great demand as a flux for the working of silver and lead ores. All the processes heretofore tried for separating the fine gold from the black sand in the working of the mines have proved but partially successful, and material improvements in these processes go on so slowly that the practical conclusion has been reached of leaving the two together for the process of reduction. This is believed to be the best plan of working the mines at present. When this method is generally adopted, the yield of the mines will be very much increased as they can be readily and cheaply worked wherever water can be got on the bars.

MONTANA.

THE GRANITE MOUNTAIN MINE.—*Cor. Butte Miner*, May 16: From reliable sources I learn that the daily work of development continues as usual—satisfactorily to those most directly interested and

very flattering to the future permanence of the mine. The dumps fairly overflow with high grade ore, and the quantity in sight in the stopes appears to be almost inexhaustible. As yet the company have taken no steps to build a mill, or to reduce their ores in those here, already to run, but idle from necessity. The Algonquin mill, it is supposed, until quite recently, would crush ore from this mine. A large amount of wood has been hauled to other works, under orders from the resident superintendent, seemingly for that purpose, but as nothing is being done towards getting the machinery in readiness, I infer that legal difficulties, of recent date, must have interfered with the arrangements that rumor had happily consummated between the St. Louis and Philadelphia companies. I am firmly of the belief, however, that whenever the Granite mine will show a million tons of \$500 rock in sight, that the poverty stricken gentleman who own it, will feel justified in erecting a five stamp water mill without losing any sleep over the expense of reduction or construction. So we of the Flint creek mining district patiently await the future.

SAN FRANCISCO CON.—The tunnel header stands in four ft of good milling rock. From the hard and compact nature of the country, the present depth of 110 ft vertical, from the surface, together with two smooth and perfect walls, I am inclined to believe that the vein will continue to improve as the level advances eastward. Certainly the mine never looked so well as at present.

NEW MEXICO.

GENERAL NOTES.—*Silver City Enterprise*, May 16: The Black Hawk mining company shipped three cars of high grade ore last week. The last shipment of ore from the Cooney mine averaged \$400 per ton. That is good enough. The Sherman mining company have agreed to furnish thirty tons of ore per day for the first month's run of the new concentrator of this city. The Organ smelter "blew in" a short time since and is said to be working very successfully and giving entire satisfaction to all parties concerned. An item has been going the rounds of the territorial press to the effect that the Bremen mine had been sold to Gustav Billing for \$500,000. Mr. Bremen denies all knowledge of the affair; hence the rumor must be false. Pat Bradley, a musician formerly of this city, but who is at present residing in El Paso, purchased the interest of Fitzgerald in the Penrose Bonanza and other mines at Fleming. Mr. Bradley will commence development upon these claims as soon as the necessary arrangements can be made. The Hillsboro stamp mill is running night and day on the Oro Fino and O'Kelley gold ore. Two hundred dollars rent is paid for the use of the mill which is obtained from the mine six or seven miles, and a loss on the mineral in the rock through a failure to work it closely is considerable, yet the owners of the property are making money and are happy. J. C. Woodward has erected a small furnace smelter at his place at the north end of town, in which he intends treating his carbonate ore from the Hanover claim, of which mention has been previously made in these columns. The smelter was tested last week and was found to work admirably as the ore is self-fluxing. The concentrator is running nicely now, is doing good work and giving perfect satisfaction. The St. Cloud ore was tried this week, and proved to be very easy of separation. The mill has need of a finer meshed screen and has one en route hither. When it comes the tailings which are not now as clean as might be desired, will be put through the mill again. What may prove an extensive strike was made last week upon one of Bremen's mines in Chloride Flat. A miner while shoveling over an old dump on the Back Bone claim ran his shovel a few inches under ground and found upon withdrawing it some very rich looking ore different in character from that of the dump. Digging was continued and the foreman notified of the important find, as it proved to be. The ore was tested by two different assays, one running \$1,880 and the other \$2,541. Fourteen tons were taken out and sacked for shipment in a very short time, and to all appearances there are no signs of a pinch in the ore body. Reports from Fleming hitherto have been somewhat contradictory as to the existence of coal in paying quantities, and in fact it might be justly urged by those totally unacquainted with the surroundings of that promising camp, that geologically considered, if it existed at all, it is the result of a displacement. The Enterprise having in view only the dissemination of reliable information, after careful inquiry, is not only pleased but gratified to make the announcement that the existence of coal in paying quantities and—for a prospect—of excellent quality has been found. The owners of this valuable find, Smith & Co., are developing as rapidly as possible, and the next twenty days will show up that which is destined in the near future to be one of the leading industries of this and the regions adjacent to Grant county. As developments progress our readers will be duly informed and in due time we are promised a descriptive article of the entire Fleming region.

UTAH.

REVIEW.—*Salt Lake Tribune*, May 16: The mining record for the week, as far as movement of the metals is concerned, has been merely nominal, the receipts being the least of any week for the year, with one exception. The receipts in this city of bullion for the week ending May 14th, inclusive, were \$48,750; of ore, \$2,850; total, \$51,600. The receipts of bullion of the week before were \$75,894.39. The shipment report is withheld for the present by the dealers. The Horn Silver shipped two cars a day regularly, amounting to 12 for the week, \$36,000. Total shipment to date, \$765,000. The Ontario made no shipments during the week, the mill being shut down for cleanup and repairs. Great interest is being taken in the opening of the new gold level; if it shall prove as much of an improvement over the 800 as the new levels have averaged, it will give a noble future to the mine. The product of the Hanauer smelter for the week was six cars of bullion, \$12,150. The bad roads in the hills are a very serious hindrance to the mining activity. In consequence of this nothing was heard from the Crescent during the week, and the Stormont also failed to show up. The roads will not improve rapidly, either, for the snows are so deep that they will supply plenty of mud for some weeks.

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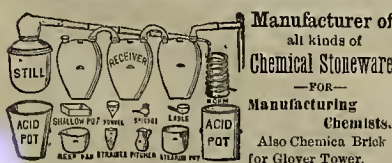
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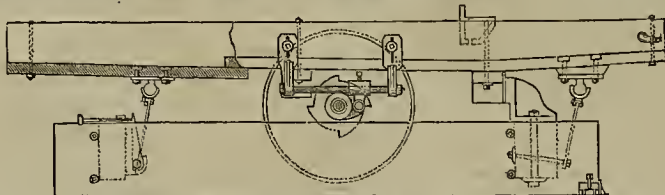
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Ingersoll, D2 3", beat Rand 3 1/2".....	.744 " "
Ingersoll, D2 3", beat National 3 1/2".....	.505 " "
Ingersoll, E 3 1/2", beat Rand 3 1/2".....	.500 " "
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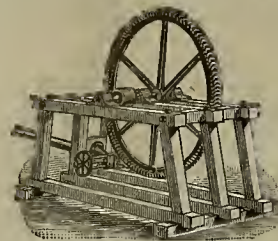
MINERS' HORSE WHIM.ONE HORSE CAN EASILY HOIST OVER 1,000 LBS.
at a depth of 500 feet. The Whim is mainly built of
wrought-iron. The hoisting-drum is thrown out of gear
by the lever, while the load is held in place with a brake
by the man tending the bucket. The standard of the
whim is bolted to bed-timbers, thus avoiding all frame-
work. When required, these whims are made in sections
to pack on mules.

120 in Actual Use.

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N. W. SPAULDING'S**PATENT DETACHABLE TOOTH SAWS,**
Manufactory, 17 & 19 Fremont St., S. F.**KNIGHT'S WATER WHEEL****For Mills, Pumping and Hoisting.**

OVER 300 IN USE!

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Sisal Rope, Tarred Manila Rope, Hay Rope, Whale
Line, etc., etc.

Extra sizes and lengths made to order on short notice.

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MANUFACTURERS OF IMPROVED AND APPROVED FORMS OF

MILL AND MINE MACHINERY.

Having made extensive additions to our Shops and Machinery, we have now the LARGEST and BEST APPOINTED SHOPS in the West. We are prepared to build from the Latest and Most Approved Patterns,

QUARTZ MILLS

For working gold and silver ores by wet or dry crushing. The Stetefeldt, Howell's Improved White, Brunton's & Bruckner Furnaces, for working base ores. Rotary Dryers, Stetefeldt Improved Dry Kiln Furnaces.

SMELTING FURNACES,

Water Jackets, either Wrought or cast Iron, made in sections or one piece, either round, oblong, oval or square. Our patterns most extensive in use. SPECIAL FURNACES FOR COPPER SMELTING. Slag Pots and Cars, Improved forms. Bullion and Copper Moulds and Ladles, Litharge Cars and Pots, Cupel Furnaces and Cars.

HOISTING ENGINES

Large or Small for flat or round rope. Double Cylinder Engines, from 6x10 to 18x60. Tide latter size furnished J. B. Haggin, or Olan and Old Abe Co., Black Hills also Corliss Pumping Engines, 20x60, for Hoisting and Pumping Works, for 2,000 feet deep. Baby Hoists for Prospecting, 4 H. P. to 6 H. P.

Wire Rope, Safety Cages and any Size and Forms of Cars.

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Frue Ore Concentrator, or Vanner Mills.

Coarse Concentrating Works, Improved Jigs, Crushing Rollers, Sizers, Trommels, Rittenger Tables, and all other adjuncts for the proper working of Gold, Silver and Copper Ores, complete in every detail. HALLIDIE IMPROVED ORE TRAMWAYS. We refer to Gen. Custer mine, Idaho, 5,000 feet long; Columbus Mine, Col., 4,750 feet long; Mary Murphy mine, Col., 5,000 feet long, all in constant operation.

LEACHING MILLS,

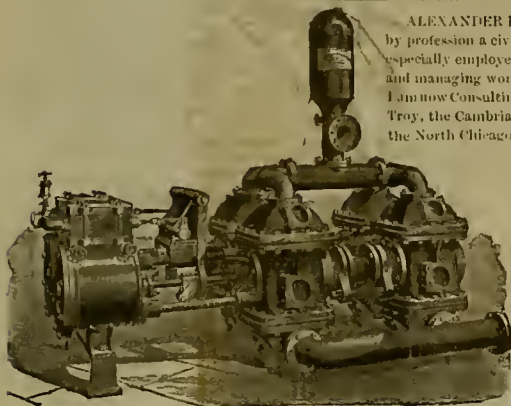
Improved Corliss and Plain Slide Valve Meyer's Cut-off Engines.

CORLISS ENGINES from 12x36 Cylinders to 30x60. PLAIN SLIDE VALVES from 6x10 to 36x36. BOILERS of every form, made of Pine Iron Works C. H. No. 1 Flange Iron, or Oils Steel. Workmanship the most careful. All Rivets Hand Driven.

McCaskell's Patent Car Wheels and Axles—Best in Use.

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WORTHINGTON MINE PUMP.



ALEXANDER L. HOLLEY, being duly sworn, says: I am by profession a civil and mechanical engineer. I have been especially employed during the last ten years constructing and managing works for the manufacture of Bessemer steel. I am now Consulting Engineer to the Bessemer Steel Works of Troy, the Cambria Iron Works, the Bethlehem Iron Works, the North Chicago Rolling Mills, the Joliet Iron and Steel Works, and the Edgar Thomas Steel Works. In all Bessemer Works the hydraulic machinery is the most expensive and the HARDEST WORKED part of the plant. Any delay or serious fluctuation in its operation is fatal to the commercial success of the Bessemer process. After extensive acquaintance with the WORTHINGTON ENGINES, and with all such other forms of pumping engines as have been applied to the purposes required, I have adopted it exclusively, and to my knowledge it is adopted in every Bessemer works running or building in America. I have also, for the same reasons, adopted the WORTHINGTON PUMPS for feeding boilers.

Will CONTRACT TO RAISE ANY REQUIRED HEIGHT SINGLE LIFT with our NEW PATENT MINE PUMP. Recent practical tests in Deep Mines of Mexico demonstrate this to be the BEST MINING PUMP extant. The largest stock of PUMPS for all purposes west of New York at our

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Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power.

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Reliance Machine Works, CLOT & MEESE,

Sole Licensed Manufacturers of the

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IRON CASTINGS OF ALL DESCRIPTIONS.

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NO ENGINES OR BELTS. NO PUMP VALVES.

PRICE OF PLANT REDUCED ONE-THIRD.

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Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

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San Francisco, Cal.



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VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

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GOLD QUARTZ and PLACER MINERS'

Silver Plated

AMALGAMATING PLATES,

For Saving Gold.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 2,000 ORDERS FILLED.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought or gold separated for low percentage of result.

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E. G. DENNISTON, Proprietor.

FIRE AND WATER PROOF PAINTS.



THE
Cheapest and Best

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Roofs

—AND—
DWELLINGS.

Averill Mixed Paints.

Prepared Ready for Immediate Use, and of any Shade or Color Desired.

Put up in 5, 1, 1/2 and 1/4 gallon cans and bbls.

Send for Supplementary Sample Card of Olive Shades to

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Also Sole Agent for the Genuine San Francisco Rubber Paints, and Dealer in OILS and PAINTERS' MATERIALS.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

FOR WEEK ENDING MAY 13, 1884.

298,336.—TRUCK AND STEP LADDER—A. H. Barnes, Reno, Nev.
298,561.—STEAM BOILER—P. F. Dutton, S. F.
298,686.—FAUCET—Peter Gardner, San Rafael, Cal.
298,471.—NAUTICAL PARALLEL RULER—Chas. Hutchinson, S. F.
298,472.—ROAD BED FOR CABLE R. R.—J. D. Isaacs, Oakland, Cal.
298,475.—LAND ROLLER—K. W. Jones, Lemore, Cal.
298,489.—COLLAR—A. J. & N. L. McAdam, S. F.
298,514.—OILER—A. J. Spicer, Portland, Or.
298,527.—FEED CUTTING MACHINE—J. Weichart, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

PEN-HOLDER.—Stephen A. Holman, Spencer-ville, Nevada Co., Cal. No. 298,090. Dated May 6, 1884. This consists in a new and useful pen-holder having a slotted stock, in which is pivoted a strip or bar, one end of which acts as a rest for the index-finger, and the other for the thumb, the whole bar serving to hold the stock at any proper inclination. Upon the stock is fitted a slotted sliding sleeve, having pivoted to it a link, the other end of which is pivoted to the bar. By the movement of the sleeve to enclose and guard the pen-point the pivoted bar is drawn into the slotted stock, and by its movements to uncover the points the bar is forced out again to act as a rest and support. The object of the invention is to provide a pen-holder specially adapted for beginners, which by its construction will compel its proper handling and use and permit an easy and comfortable grasp, and which may, when not in use, be closed up out of the way.

TOBACCO SWEATER.—George Brownstein, S. F. No. 297,668. Dated April 29, 1884. This invention relates to that class of tobacco curing or treating machines known as "tobacco sweaters," and more particularly to that subclass in which the tobacco is contained within a close, steam-tight and water-tight vessel, which is surrounded by a steam or water jacket. In machines or devices of this class great care must be taken to prevent the water or steam getting into the tobacco. It is necessary rather to steam it in its own vapor, and these vapors ought to be kept in while the steam is kept out. Various devices have been tried to accomplish these results. Mr. Brownstein's apparatus is constructed in such a manner that he claims that he can do this.

FIRE ESCAPE.—Elam Dye, S. F. No. 294,860. Dated March 11, 1884. This fire escape consists in a peculiar extensible frame, in the means for operating it, and in certain details of construction. The object is to provide a means for the escape of persons from the windows of a burning building, and for such similar purposes. Sections slide within each other, and there is a cage suspended within the frame sections and adapted to be raised and lowered by a rope and suitable gearing.

VEHICLE.—Jacob Price, San Leandro. No. 297,714. Dated April 29, 1884. This improvement in vehicles consists of a frame, the side pieces of which are formed of continuous bars of flanged or angle iron, with lugs for the attachment of the seat or other parts, and curved strengthening ribs at the points where bends are made. This frame is designed specially for phaeton village carts and light-riding carriages. The side bars are shaped to form the body.

GRAIN SEPARATOR.—Pontalia L. Nash, Hollister. No. 295,668. Dated March 25, 1884. The improvements covered by this patent mainly consist of certain details of construction difficult of intelligent description without the aid of engravings.

Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First Street, a *Ruthford Pulverizer*, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. References as to above can be had upon applying to this office.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replenished and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	24.	25.	Apr 16	May 19.	June 9.	B. Burris.	309 Montgomery st
Argenta M Co.	Nevada.	17.	10.	Apr 16	May 20.	June 11.	E. M. Hall.	327 Pine st
Best & Belcher M Co.	Nevada.	23.	50.	Apr 15	May 21.	June 11.	M. Hale.	309 Montgomery st
Bullion M Co.	Nevada.	29.	25.	May 19.	June 20.	July 10.	J. M. Brazier.	323 Montgomery st
Butte Creek Hyd. M Co.	California.	9.	10.	May 13.	July 10.	July 30.	E. L. Taylor.	230 Montgomery st
California M Co.	Nevada.	12.	20.	May 25.	June 27.	July 24.	C. P. Gordon.	309 Montgomery st
Cueva Santa M Co.	Mexico.	2.	10.	May 19.	June 24.	July 15.	W. Letts Oliver.	323 Montgomery st
Perless M Co.	Nevada.	20.	05.	Apr 30.	June 5.	June 26.	C. L. McCoy.	309 Montgomery st
Champion M Co.	California.	12.	15.	May 7.	June 12.	July 2.	B. Burris.	323 Montgomery st
Gholiar M Co.	Nevada.	13.	50.	Apr 21.	May 23.	June 12.	W. E. Dean.	309 Montgomery st
Dayton M Co.	Nevada.	12.	20.	May 2.	June 7.	June 27.	D. C. Bates.	309 Montgomery st
Excelsior Water Co.	California.	1.	50.	Jan 29.	May 14.	June 11.	H. B. Wheaton.	215 Sansome st
Exchequer M Co.	Nevada.	20.	20.	May 3.	June 6.	June 26.	C. E. Elliott.	309 Montgomery st
Equitable Tunnel M Co.	Utah.	23.	10.	Feb 12.	May 28.	June 20.	W. Van Bockelen.	419 California st
Eintracht Gravel M Co.	California.	15.	05.	May 13.	June 28.	July 17.	H. Kunz.	209 Sansome st
Grand Prize M Co.	Nevada.	16.	25.	May 16.	June 20.	July 16.	E. M. Hall.	327 Pine st
Hale & Norcross S M Co.	Nevada.	82.	75.	May 10.	June 12.	July 2.	J. F. Lightner.	309 Montgomery st
Indian Spring Drift M Co.	California.	2.	05.	May 3.	June 6.	July 2.	A. B. Paul.	323 Montgomery st
La Grange Ditch and M Co.	California.	8.	50.	Mar 31.	May 5.	May 26.	C. Halsey.	328 Montgomery st
Lady Washington M Co.	Nevada.	4.	10.	Apr 4.	May 9.	May 29.	W. H. Watson.	302 Montgomery st
Mayflower M Co.	California.	24.	10.	May 9.	June 12.	July 7.	J. J. Moritz.	328 Montgomery st
McElroy Gravel M Co.	California.	11.	10.	May 7.	June 10.	July 10.	E. W. Levy.	604 Merchant st
Mexican G M Co.	Nevada.	26.	50.	Apr 16.	May 20.	June 10.	C. E. Elliott.	309 Montgomery st
Murphy M Co.	California.	8.	15.	Mar 31.	May 8.	May 27.	W. Letts Oliver.	323 Montgomery st
Ophir M Co.	Nevada.	47.	1.00.	Apr 3.	May 6.	May 26.	E. B. Holmes.	309 Montgomery st
Puget Sound Iron Co.	Washington.	7.	1.00.	Mar 12.	Apr 25.	May 29.	A. Halsey.	328 Montgomery st
Pink M Co.	Arizona.	1.	25.	Apr 8.	May 17.	June 11.	G. R. Wells.	309 Montgomery st
Rainbow G M Co.	California.	10.	10.	Apr 15.	May 16.	June 11.	S. S. Jordan.	311 Montgomery st
Savage M Co.	Nevada.	59.	50.	Apr 5.	May 9.	May 23.	E. B. Holmes.	309 Montgomery st
Sierra Nevada M Co.	Nevada.	79.	1.00.	May 10.	June 12.	July 2.	E. L. Parker.	309 Montgomery st
Segregated Belcher M Co.	Nevada.	22.	1.00.	May 9.	June 11.	July 1.	G. D. Edwards.	414 California st
Tilden M Co.	Nevada.	3.	05.	Apr 15.	May 19.	June 19.	C. V. Hubbard.	310 Pine st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Caledonia M. Co.	Nevada.	W. Letts Oliver.	323 Montgomery st.	Annual	June 3
Gaynor M. Co.	Nevada.	C. K. Watson.	126 Kearny st.	Annual	June 3
Goodshaw M. Co.	Nevada.	C. C. Harvey.	323 Montgomery st.	Annual	June 3

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M. Co.	California.	D. C. Bates.	309 Montgomery st.	25.	May 15
Best & Belcher M. Co.	California.	C. W. Sessions.	309 Montgomery st.	50.	May 15
Butte Creek Hyd. M. Co.	California.	T. Wetzel.	322 Montgomery st.	10.	May 15
Idaho M. Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Apr 2
Jackson M. Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar 19
Kentuck M. Co.	Nevada.	J. W. Pew.	310 Pine st.	10.	May 19
McElroy Valley M. Co.	Nevada.	W. Letts Oliver.	323 Montgomery st.	10.	Apr 28
Standard Con. M. Co.	California.	Wm. Willis.	309 Montgomery st.	25.	Mar 12
Syndicate M. Co.	California.	J. Stadfeld.	419 California st.	10.	Apr 5

San Francisco Metal Market.

[WHOLESALE.]	
THURSDAY, May 22, 1884.	
ANTIMONY—Per pound.	14 @ 15
BORAX—Per Pound (extra).	16 @
IRON—Glenbrook, ton.	25 @
Eglington, ton.	24 @
American Soft, ton.	28 @
Oregon Pig, ton.	28 @
Clippers, Nos. 1 to 4.	32 50 @ 35 00
Refined Bar.	31 @
Horseshoes, keg.	7 @
Nail Rod.	7 1/2 @
Navy, according to thickness.	7 @
STEEL—English (Cast, lb).	15 @ 16
Black Diamond, ordinary sizes.	14 @
Drill.	15 @ 16
Machinery.	12 @ 14
COPPER—Ingot.	22 @
Braziers' sizes.	25 @ 27
Fire-box sheets.	28 @
Bolt.	25 @
Old.	8 @
Bar.	— @
Cement, 100 fine.	12 @
LEAD—Pig.	4 @
Bar.	— @
Pipe.	7 @
Sheet.	8 @
Steel, discount 10% on 500 bag; Drop, 7 bag.	2 1/2 @
Black, do.	3 @
Chilled, do.	2 5/8 @
TIN PLATES—Charcoal.	7 00 @ 7 25
Coke.	6 00 @ 6 75
Terne.	6 15 @
1 C. charcoal, do.	6 25 @ 6 50
ZINC—By the cask.	19 @
Sheet, 7x3 ft. 7 to 10 lb. less the cask.	9 @ 10
NAILS—Assorted sizes.	3 25 @
QUICKSILVER—By the flask.	29 @
Flasks, new.	1 03 @
Flasks, old.	85 @

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Mining Share Market.

There is not much new to report in mining stock circles. The financial panic in the East did not affect our stock market to any extent. At Gold Hill the Kentucky, Yellow Jacket, Crown Point, Belcher and some other mines are taking out the usual amount of low grade ore. Work has not yet been resumed on the 2800 level of the Hale & Norcross, where the fine prospects were recently found. When work is again commenced there the brokers expect a livelier market. In the Best and Belcher, very favorable indications are found both on the 1200 level and on the 2700 level. The winze below the 300 level of the Mexican has passed through a streak of white, barren quartz, and is now in the dark, compact kind of rock which, in this part of the Comstock, has been found on the east side of the ore veins. The bottom of the winze is perfectly dry, but water will be seen when the ore vein is about to be cut. At the north end the northeast drift on the 300 level of the Sierra Nevada is passing into a new and peculiar formation. The rock somewhat resembles birdseye porphyry, but contains much quartz.

Bullion Shipments.

Hanauer, May 13, \$5,950; Horn Silver, 17, \$12,000; Hanauer, 16, \$1,730; Stormont, 16, \$3,000; Horn Silver, 14, \$6,000; do., 16, \$12,000; do., 17, \$9,000; Hanauer, 18, \$3,300; Horn Silver, 18, \$9,000.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK BEG. MAY 1.	WEEK END. MAY 8.	WEEK BEG. MAY 15.	WEEK END. MAY 22.
Alpha.	1.10	1.55	1.50	1.10
Andes.	1.30	1.75	1.50	1.25
Argenta.	.10	.20	.15	.20
Belcher.	.95	1.05	.90	1.15
Best & Belcher.	1.30	1.75	1.50	1.75
Bullion.	.35	.65	.60	.70
Bonanza King.	.35	.40	.30	.35
Belle Isle.	.45	.55	.50	.60
Butte Con.	4.15	4.35	3.90	4.25
Butte Hyd.	.30	.45	.35	.45
Bodie Tunnel.	.60	.80	.40	.50
Bulwer.	.25	.20	.25	.20
California.	.70	1.65	1.25	1.05
Challenger.	.20	1.25	1.10	1.20
Chollar.	.70	1.65	1.25	1.05
Confidence.	.20	1.25	1.10	1.20
Con. Imperial.	.20	.25	.20	.20
Con. Virginia.	.20	.25	.20	.20
Con. Pacific.	.20	.25	.20	.20
Crown Point.	1.15	1.35	1.25	1.40
Day.	2.00	2.25	2.40	2.45
Eureka Con.	4.00	4.10	4.00	4.00
Eureka Tunnel.	.25	.30	.15	.20
Exchequer.	.25	.30	.15	.20
Grand Prize.	.25	.30	.15	.20
Gould & Curry.	1.00	1.65	1.30	1.60
Goodshaw.	.15	.25	.10	.15
Hale & Norcross.	.40	2.50	2.10	2.05
Holmes.	2.75	3.00	2.40	2.35
Independence.	.20	.25	.20	.20
Julia.	.20	.30	.20	.25
Justice.	.20	.30	.20	.25
Martin White.	.20	.30	.20	.25
Mono.	1.20	1.45	1.10	1.65
Mexican.	.75	1.35	1.20	1.60
Mt. Diablo.	.20	.30	.20	.25
Northern Belle.	.20	.30	.20	.25
Nevada.	.20	.30	.20	.25
Occidental.	1.00	1.00	1.00	1.00
Ophir.	.30	.65	.50	1.45
Overman.	.20	.25	.20	.25
Potosi.	.40	.75	.55	.65
Pinal Con.	.20	.30	.20	.25
Savage.	.20	.30	.20	.25
Seg. Belcher.	1.30	2.70	2.35	2.60
Silver Hill.	1.30	2.70	2.35	2.60
Silver King.	5.00	5.25	5.00	5.25
Scorpion.	.25	.40	.25	.30
Syndicate.	.45	.50	.30	.35
Togo.	.40	.50	.30	.35
Union Con.	1.60	2.50	2.10	2.15
Uta.	1.20	1.60	1.40	1.30
Yellow Jacket.	1.65	2.15	1.95	2.10

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345 Alta.	1.55 @ 2.00	AFTERNOON SESSION.		
50 Andes.	.40 @	680 Alta.	1.90 @ 2.00	
405 Bodie Con.	3.00 @ 4.05	100 Alpha.	1.00 @ 1.10	
1400 Benton.	.45 @ 50	100 Bodie.	.60 @	
40 B. & Belcher.	.20 @	300 B. & Belcher.	.20 @	
1000 Belle Isle.	.55 @	720 Benton Con.	.45 @	
20 Belcher.	1.00 @	100 Belle Isle.	.60 @	
100 Belmont.	.70 @	50 Belcher.	1.00 @	
300 Chollar.	1.65 @ 1.15	100 Chollar.	1.10 @ 1.15	
500 Con. Virginia.	.20 @	200 Crown Point.	.125 @	
25 Confidence.	1.20 @	50 Confidence.	.125 @	
420 Exchequer.	.10 @	100 Hale & Norcross.	2.00 @ 2.25	
50 Gould & Curry.	1.35 @ 1.45	600 Mono.	.75 @	
850 Hale & Norcross.	2.35 @ 2.40	300 Mexican.	1.75 @	
100 Independence.	.30 @	100 Mt. Diablo.	1.15 @	
100 N. Belle Is.	.20 @	300 Mexican.	1.75 @	
270 Ophir.	1.20 @ 1.25	570 Sierra Nevada.	1.15 @ 1.40	
100 Sierra Nevada.	1.30 @	250 Union.	1.85 @	
150 Savage.	.75 @ 80			

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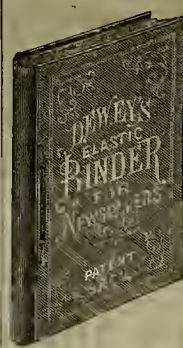
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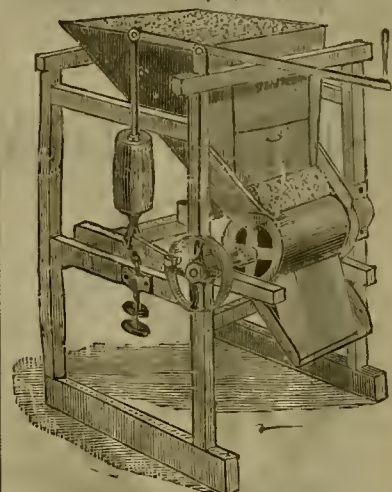
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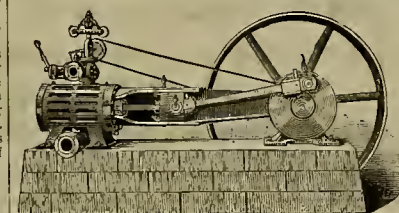
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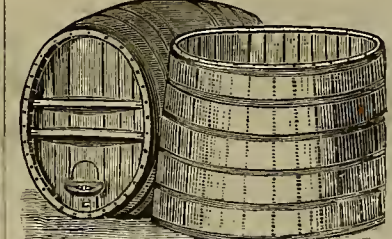
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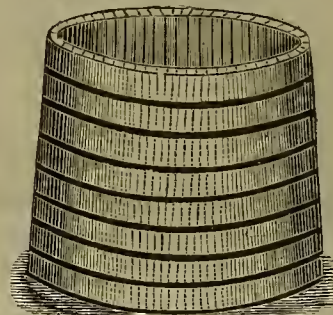
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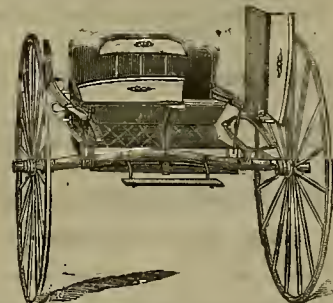
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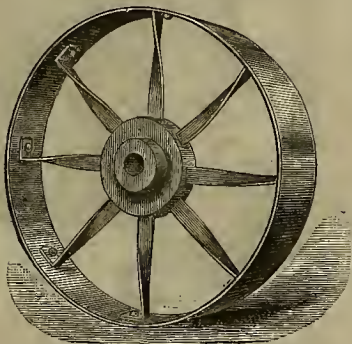
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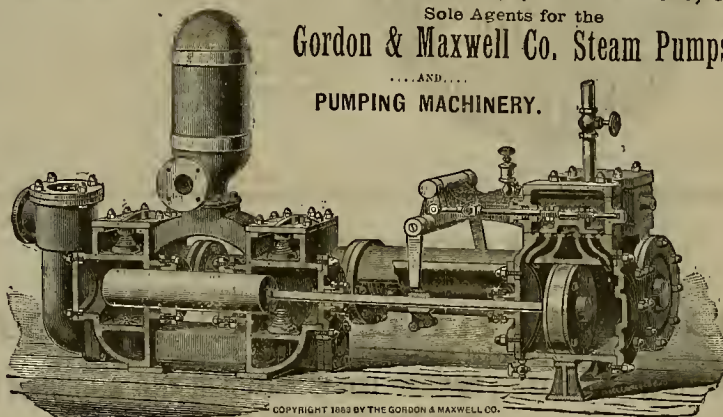
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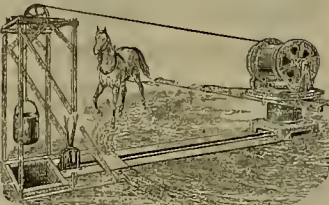
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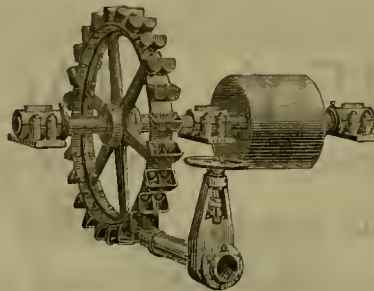
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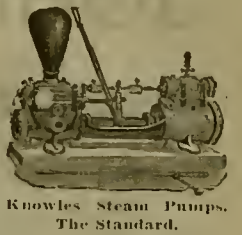
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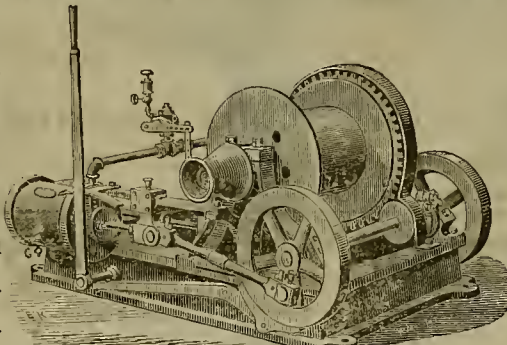


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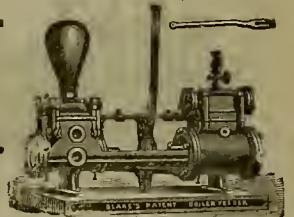
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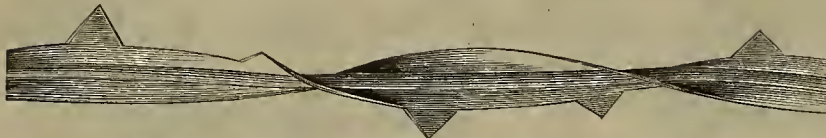
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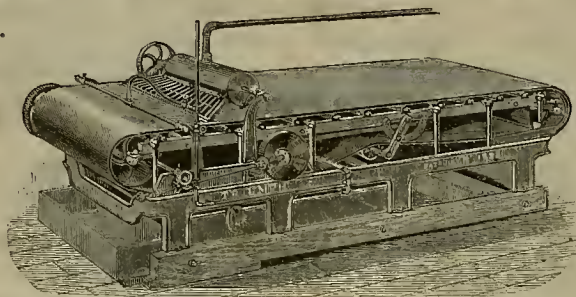
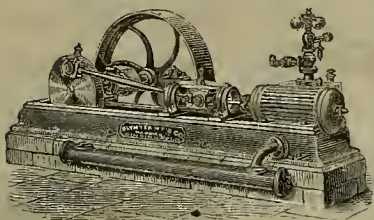
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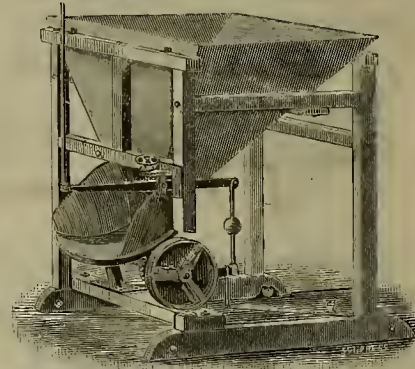
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COMPOUND AND CUPS,

THE ALBANY CYLINDER OIL,

LARD OIL, WEST VIRGINIA LUBRICATING OIL,

The Albany Spindle Oil,

THE ALBANY VALVOIL,

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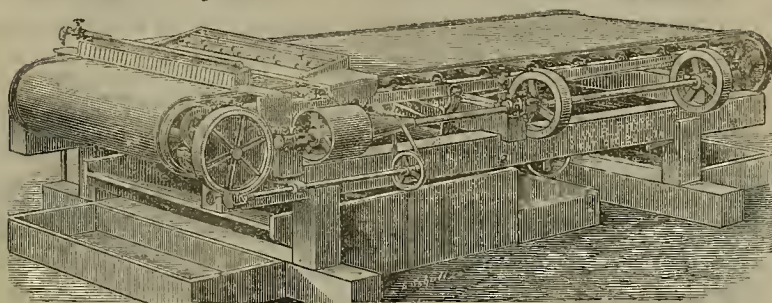
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These Lubricants have been for the last eight years, and are now, in general use in nearly all the mills, mines and steamers on this Coast, and the fact that the demand constantly increases is sufficient evidence of their superiority.

\$1,000 CHALLENGE!

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THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.

OVER 800 ARE NOW IN USE. Saves from 40 to 100 per cent. more than any other Concentrator; concentrations are clean from the first working. The wear and tear are merely nominal.
A machine can be seen in working order and ready to make tests at the office of Hinekey, Spiers & Hayes, No. 220 Fremont Street, San Francisco.

To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER. Agents Frue Vanning Machine Co.

Room 7 - No. 109 California Street,
January 3, 1884,

SAN FRANCISCO, CAL.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MAY 31, 1884.

VOLUME XLVIII
Number 22.

Mine Models.

Clarence L. Anderson of this city has just patented through the MINING AND SCIENTIFIC PRESS a novel topographical representation or model which will show the surface or subterranean features of a mine and its surroundings. By it one may represent clearly the shafts, drifts, tunnels etc., and also the surface of the country immediately around the mine. The ordinary workings of a mine may, by this device, be readily explained to those interested so as to be easily comprehended, whether in the ordinary course of business or in litigation for the subservience of justice.

The surface contours and interior workings of all kinds are usually shown by maps which give horizontal distances only; but by means of this invention the vertical as well as the horizontal distances are given, which at a glance will give the court, jury or mine superintendent a correct idea of the relative positions of the surface of the ground, the shafts, stopes and other excavations of a mine.

A horizontal datum or base plane is made of wood or other light material, and from the several corners small posts of the desired length are placed to support side-pieces, the upper edges of which represent the surface of the ground on that vertical plane. These side-pieces support the top of the model, which consists of a strip carved to a reduced fac-simile of that portion of the surface-ground which it represents, its edges being a reduced line of contour of the ground at that elevation. To this top piece several ribs are fastened which extend to the side pieces to which they are secured by dowels or screws. These ribs are also curved to represent the slope of the ground radiating from the top, and are necessary to support the other strips which represent more minutely the contour of the surface, their outer edges being carved to reduced lines of the contour of the surface of the ground at the elevations they are placed to represent. The contour-strips are held in place by the ribs and side pieces. The tunnels or drifts are represented by means of pieces of wood carved to a reduced fac-simile of the excavations they represent. These strips or pieces of wood are preferably formed by gluing several thicknesses of veneer together, with the grain of one piece of veneer crossing at or near right-angles the grain of the piece next to it, whereby the pieces are strengthened and stiffened without sacrificing lightness. The tunnels or drifts and the shafts may be vertical or inclined. The pieces representing tunnels or drifts are attached to the strips representing shafts at distances from each other corresponding to the difference in the levels of the tunnels or excavations they represent, and they are held in the proper position in the model by pieces of wire secured to them, and to contour strips, ribs or datum planes.

The stopes are represented by thin pieces of veneer, metal or other material placed in a horizontal position, their edges being curved to a reduced fac-simile of a contour line of the excavation they represent. These horizontal pieces

are fastened together by being screwed, nailed or glued to thin pieces of wood, the edges of which represent a reduced vertical cross-section of a portion of the excavation or stope. When fastened together they are held in their proper places in the model by wires extending from them to ribs, contour strips or the datum plane, as may be required.

THE trial of the suit of Whittier, Feller & Co. against the Castle Dome Mining and Smelting Co. was begun Monday before Judge Greene and a jury, in Department Two of the Superior Court, Alameda Co. The complaint in this case alleges that the plaintiff loaned defendant corporation \$316,032, of which sum and interest \$316,130 have been repaid. The suit is brought to recover the difference, \$50,901.53. The answer avers that the only sum due is \$25,855.34, and also, under special agreement the money is not payable until June 1, 1884; hence the demand is premature. The

Mortars.

The mortars in quartz mills are now usually placed directly upon the vertical mortar-blocks, without any horizontal piece intervening, and are secured in their place by bolts. They have been made with a solid bed plate with sides and ends of wood; but they are now generally made entirely of iron. The mortar for general use in wet crushing on this coast is an iron box four or five feet in length and depth, and twelve inches inside, the bottom sides and ends all in cast in one piece. The feed opening is made three or four inches wide and nearly as long as the mortar. On the opposite side is the discharge opening, furnished with the screen. The opening is as long as the mortar, or nearly so, and 12 to 18 inches deep, the lower edge being two or three inches above the top of the die. In some mortars, especially for dry crushing, the discharge is on both

surface, is apt to wear out faster than the other. A piece of canvass is usually hung before the screen for the crushed ore to splash against as it issues from the mortar.

California-Made Tools.

Among those local industries which have grown rapidly since their commencement, machine tool making is conspicuous. Starting in a small way, in a small shop, the San Francisco Tool Company, under the guidance of a skilled and educated mechanic, has grown in a few years until it occupies now a large four-story building and has as many orders as it can fill. For one firm alone this company now has about \$20,000 worth of work on hand. The tools are made mainly from original designs, and are especially adapted for the work we have to do on this coast. An engraving on this page shows one of the patented improved 17-inch engine lathes made by this tool company. These lathes are made to change instantly from screw cutting to feeding nearly on the same principle as the Bement & Sons' lathes. An important feature is that the apron gearing is so arranged that screws of any pitch can be cut without the use of an extra belt for driving the belt backward, only one driving belt being used. In this way the lathe need not be stopped until the screw is finished. These lathes are made boring bars, dispensing with the ordinary forged tools used for that purpose. They are made with flat-topped frames, and with angular guides for the carriage, as may be desired. The spindles and screws are of steel; bearings of bronze. There are no soft metal nuts, and the whole tool is strong, durable and complete. Another new tool being made by this company is the high-speed drilling machine, a representation of which is given on this page. These machines have no gearing, and are specially suited for small drills to 1 inch diameter. The table is balanced and can be instantly set up or down, or removed from the column entirely, to permit large pieces to be brought under the spindle. The machine requires no counter-shaft, being arranged with the necessary driving pulleys mounted on the main column. The spindles are of steel, and the whole carefully fitted. Drills to the center of pieces 30 inches in diameter. This tool is made to take the place of the larger and more expensive drilling machines. They have no tooth

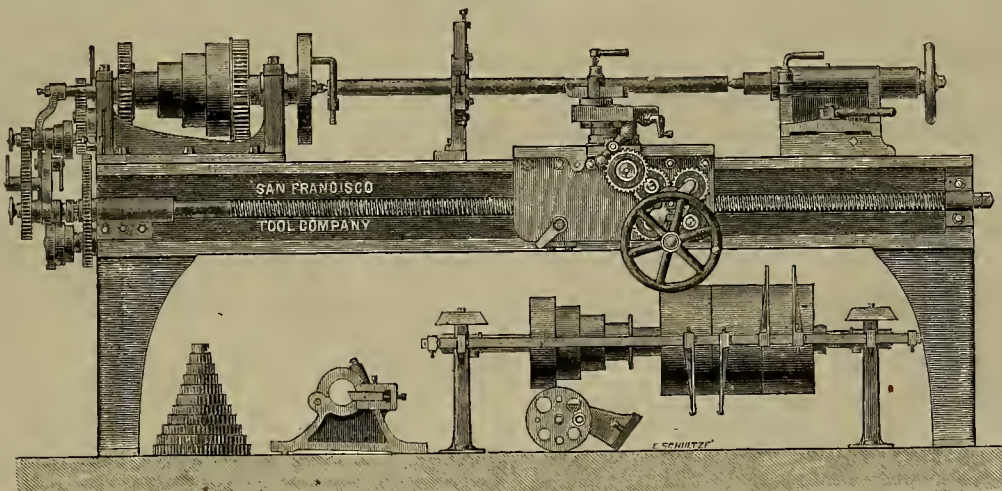
gearing and are noiseless at any speed, the spindle being driven by belts alone.

COL. A. F. WILLIAMS, whose death was announced last week, surveyed and constructed a number of mining ditches in this State. He was engaged on some of the largest ditches in Nevada county. He brought the water into Oroville, Butte county, and also built ditches at La Porte, Howland Flat and Pine Grove.

OWING to the failure of Congress to appropriate money for continuing the hydrographic branch of the Signal Service, the office in this city will be discontinued after June 30th.



HIGH SPEED DRILLING MACHINE.



RICHARDS' IMPROVED 17-INCH LATHE.

Castle Dome Company was engaged in the production of refined white lead.

HOW A MINE WAS NAMED.—A quartz claim near the town of Graniteville, in the upper part of Nevada county, is called the Hot Water mine. The *Transcript* says it derived its name from the fact that the two bachelors owning it having read that pure hot water was the most healthful and palatable drink ever discovered, some time ago eschewed tea, coffee and stronger drinks, and now confine themselves to hot water, with the very best results to their constitution as well as their purse.

sides, in which case the feed opening is above the screen; but the single discharge is more common. The screen-frame fits in grooves in the mortar and is secured by wedges.

Sometimes screens are vertically placed, but generally there is a slight incline, the latter being thought to facilitate discharge. Several varieties of screen are used. When made of brass wire cloth they have from 40 to 60 meshes to the lineal inch. More generally for wet crushing they are of Russia sheet iron, having finely punched holes varying from one fortieth to one twenty-fourth of an inch in diameter. The wire cloth, while it affords more discharge

CORRESPONDENCE.

We cannot, unendorsed, opinions of correspondents.—Eds.

Gold Saving.

EDITORS PRESS:—Permit me to write a few lines in answer to "Mr. Duval, M. E., of Angels, Calaveras county." He has evidently mistaken the tenor of my letter on "Gold Saving." I thought every one reading that article would naturally see that I was speaking of the treatment of "free gold" only—not of gold chemically or mechanically combined with sulphurets. Judging from the number of letters I have received from all parts of the State and elsewhere on the subject, he is alone in his ideas. My tests and assays have been always made after the sulphurets have been eliminated, then the amount of free gold ascertained. Mr. Duval's letter seems to have but two objects—cynicism on the one hand, and a defense of amalgamators on the other—rather than to look at the matter involved, and offer some remedy; for to deny the existence of the loss is futile and puerile, the opinion of such practical amalgamators as Mr. D. mentions notwithstanding. We want some practical suggestions, that may aid in preventing the loss of the free gold where it exists in such fine particles in the gangue of so many of our quartz lodes in California. Further, I did not base my opinion on the dictum of "incompetent amalgamators, or by the experiments of Tyros who, with no practical experience, attempts to revolutionize gold saving." Such remarks are foreign to the point at issue—said for effect only. The best amalgamators, of long-standing experience, seldom like to admit that they lose any gold by passing off in the slimes, for they have the foolish idea that to admit such would be to confess their own incompetency. Such is not so. It is the appliances and system that is at fault, and not themselves. Further, amalgamators have only a crude idea of the actual value of ore they crush, by the amount of quicksilver the pulp takes, which of course is shown by the condition of the outside plates. This tell-tale plate is very uncertain under different and various conditions—muddy water, much base metals in gangue, temperature of water, and numerous other obstacles that present themselves to the millman. Certainly, the object of my article was to obtain the opinion of all practical millmen and mining men towards arriving at some solution of the problem of free gold "saving," to obtain the maximum amount by some better process than the stamp mortar amalgamation, and by trying to save gold by running water down stream. Willard M. Duval, another question. What use are statistics when compiled by scientific men, if we are not to make use of them? or are we to take all such productions *cum grano salis*? I am pleased that my letter interested Mr. D., and would like him to aid the matter by some practical suggestion that may lead to an absolute revolution of the present old and faulty system. He will be a public benefactor, and our letters will have done some good. WM. F. DRAKE, Superintendent Patterson Mine.

Progress in Mine Engineering.

In the economical underwatering of mines no very manifest progress has been made in modern times. Forty or fifty years ago the Cornish pumping engine had been brought to a degree of efficiency and economy which has not been surpassed by any more recent type, but its large first cost and generally ponderous character has led to the introduction of many forms of direct acting engines, cheaper, simpler and more easy of application, if somewhat less economical in subsequent working. Many of these placed underground are now forcing columns of water to vertical heights of as much as 600, and up to 1,100 feet, the only incumbrance in the shafts being the steam and water pipes, and as the pumps are double acting and the flow of water practically constant, these pipes for a given discharge may be very considerably smaller than would be required for ordinary lift-work. Direct acting engines are either rotary (controlled by a fly-wheel) or non-rotary, and of the latter class the one designed by Mr. Davey, with his beautiful differential valve gear, may be cited as an excellent example. This valve gear has also been applied to control Cornish engines, with the best results. As might be expected under such heavy water columns, some trouble has been experienced with the valves or clacks, and Mr. Davey has got the best results from a modified form of Harvey and West double beat valve. Direct acting pumps actuated by hydraulic power have been found very useful in draining dip workings, the dispensing with rods and substitution therefore of a simple line of pipes being a very great convenience, and at Clanshal a pair of rotary engines has been erected, driven by a hydraulic head of 1,950 feet, the pumps being 13 inches diameter and 24½ inches stroke, capable of forcing at 12 revolutions per minute 330 gallons to a height of 750 feet, the percentage of useful effect being 35. At lower speeds this duty sinks, and at three revolutions is only 15 per cent, and the cost of the installation was very great. It could only be under very exceptional circum-

stances that this would be repeated. In Germany, Rittinger's pump, with a tubular rod, is regarded very favorably, and has of late been extensively adopted. Amongst minor, but important details, the substitution of wrought iron for cast in main engine beams may be mentioned, the form given being either rolled slabs, as at Clay Cross, or built up plate web girders.

In metalliferous mines, and especially in Cornwall, where fuel is costly, great attention has always been paid to the construction and setting of boilers, and to contrivances to economize fuel. It is only in recent years, however, that the increasing value of small coal, and perhaps less indifference among managers, have caused these matters to receive the attention at collieries to which they are entitled. And accordingly we find the antiquated egg-ended, externally fired boiler has followed in the wake of its predecessors—the "hay-stack" and "waggon," and has been displaced by the Cornish or Lancashire flued boilers, often with conical tubes and sometimes with mechanical stokers, and where coking is practiced the escaping gases, instead of being a nuisance in the vicinity, are now conducted under the boilers and utilized in the generation of steam. In some cases, by the aid of gas producers, refuse coal is thus utilized, which boilers, pipes and cylinders are carefully covered to prevent waste of heat (silicate and cotton being about the best material for the purpose), and the warming of the feed water in some manner by otherwise waste heat is very generally practiced.

That very difficult problem how safely to light our fiery mines remains unsolved. No very great advance has been made in recent years, and we still await the discovery of a safe safety-lamp. The lamps invented by Davy, Stephenson and Clanny, nearly 70, and by Mueseler over 40 years ago, none of which are absolutely safe, are still in very general use. The simple expedient of placing the Davy in a close shield of tin can has diminished the risk, and the Marsant improvements have added to the efficiency of the Mueseler. In some collieries it is now the practice to test each lamp before use by contact with or immersion in gas. The electric light is in use for lighting surface operations, such as screening, etc., for which it is well fitted, and it has been tried underground but not with very satisfactory results. As a miner's lamp none of the forms yet proposed are of service. The miner's lamp must be self-contained, no lamp requiring a detached battery or having wires attached is of any use; it must give at least 12 hours sustained light, must be portable and admit of being placed in almost any position to suit the requirements of the moment, and ought not to exceed three to four pounds weight in its complete state, and it must not require any but the very slightest attention on the part of the miner to keep it in order during work.

The furnace as a means of producing a current of ventilation is being rapidly superseded by mechanical means. More than three centuries ago fans were in use on a small scale for this purpose, but it is only in recent years that they have been employed of sizes and capabilities commensurate with the magnitude of modern collieries. The several types in common use, with their efficiency, may be classed as follows:

Type.	Name.	Efficiency, per cent.
Closed case fan.....	Griffith.....	40 to 61
Closed case fan.....	Schuler.....	46 to 49
Open running fan.....	Waddle.....	53
Displacement machines.....	Struve.....	58
Displacement machines.....	Root.....	48
Displacement machines.....	Nixon.....	46
Displacement machines.....	Gooke.....	37
Displacement machines.....	Leniellie.....	24
Screw.....	Pelzer.....	3

The best fans are decidedly more economical than furnaces, and even were not this so, their greater safety ought to lead to their exclusive adoption in every mine in which there is a possibility of explosive gas being met with.

Although in the means of generating a powerful ventilating current we may claim considerable improvement, the best methods of distribution are not always practiced, and notwithstanding that nearly 80 years have passed away since Buddie introduced the system of splitting the air and district or panel airing, we find collieries where the advantages thus to be gained are lost sight of. In steep mines also more attention should be paid to ascensional ventilation.

To ascertain the quantity of air passing through a road it is no longer necessary to guess by the aid of a puff of powder smoke or by carrying a candle with flame kept upright as did our fathers. We possess now very accurate and reliable anemometers which 50 years ago were quite unknown, those of Biram (revolving vanes) and Dickinson (vertical vane) being most convenient and largely used.

In what state does fire-damp exist in situ, and what are the effects of varying atmospheric pressure upon its liberation? and is the barometer of any value as a warning of coming danger? These are questions which early attracted attention, and have been much discussed. Mr. Wood has carried out a most extensive series of elaborate and careful experiments to ascertain the conditions as to the solid coal, and Mr. Corbet has rendered a similar service in respect of goafs, and the conclusion seems to be in both cases that the barometer affords no reliable indications when to expect danger from gas in mines.

The influence of coal dust in explosions has been carefully investigated, and though it is not established that dust alone may be the cause of an explosion it is conceded that in a dusty

atmosphere the addition of a smaller quantity of fire-damp is requisite to bring it to the explosive point, and that the effects of an explosion may be intensified and extended by the presence of dust, and accordingly in many very dry and fiery mines the main roads are kept regularly watered, or still better, by sprinkling salt upon the dust the same object is attained without the liability of causing the floor to heave and swell. Several instruments have been devised for detecting the presence of minute quantities of fire-damp in air, such as those of Forbes, Ansell and Liveing, but none of them are of any practical use to the operative miner, and they are chiefly interesting as very ingenious scientific toys.

A review of progress would not be complete without some mention of the increased safety with which coal mines are now worked. In 1851 the deaths from accidents of every kind in the coal mines of the United Kingdom were 4.56 per 1,000 people employed, while in the decade ending 1860, the ratio was 4.07, in the decade ending 1870, it was 3.32, and in the decade ending 1880, it was 2.35, and for the two years 1881-82 the ratio is 2.081. Without attempting to go minutely into particulars it may be briefly stated that this marked improvement is entirely in those classes of accidents in the prevention of which improved machinery and appliances, increased knowledge, better discipline, and more competent supervision may be expected to have greatest effect. While on the subject of accidents mention may be made of the Flenns apparatus, by aid of which the explorers at Seaham Colliery were enabled to penetrate into the workings a distance of 400 yards in an irrespirable atmosphere. In cases of accident causing serious injury, the patient's sufferings have often been intensified by his being jolted to his home in a stiff springless cart, but the labors of the St. John's Ambulance Association have extended a knowledge of how to give first aid, and ambulance or stretchers of a simple kind, by which the pain consequent on removal is much lessened, are now provided at many large mines, and ought to be at all.—London Mining Journal.

Mines and Mining in Arizona.

These be stale subjects upon which to write, says the Prescott Courier, and yet an article upon them is always in order, or should be, in a country like Arizona, where mining is certainly a leading industry. Less than 30 years ago venturesome men took their lives in their hands, as the saying is, and started the quartz mining industry in southern Arizona. They merely succeeded in proving the mines valuable, when the Apaches forced them to abandon work. The war of the sections soon followed, and almost put a stop to industry of every kind in Arizona. Its close did not help matters much, for the Indians still remained and would not permit development. It was not until in 1873, after General Crook and his soldiers had subdued the savages, that the work of exploration was really begun in the territory. The splendid mines of Tombstone were soon after discovered and worked. The Silver King and scores of other mines were made good use of, and immediately raised the reputation of the territory. We have now ten counties, all of which, save one, are well filled with metals and minerals. Nevada had but two great mining camps, Virginia and Eureka. Arizona has already Tombstone, Silver King, Vulture, United Verde, Quijotoa, Mineral Park, Signal, Clifton, and many others we might name. Although old, these camps are still very lively places. Until recently the southern counties have led in mining; now the counties of the north are coming forward, and will, without doubt, shortly take the lead.

Two transcontinental railroads have aided the people of this territory to unearth vast treasures, but the country now demands, north and south, railroads with branches to the richest mining districts. These we are promised at an early date. They cannot be given us too soon; our people are ready for them. They will traverse sections of country which are rich in gold, silver, copper, lead and other metals, as well as in timber, farming and grazing lands. They will open up Tonto Basin, the Mogollon forests; they will connect Mineral Park, Flagstaff, Ash Fork, Williams, Prescott, Phoenix, Tempe, Florence, Casa Grande, Tucson, Tombstone, Benson, Yuma, Globe and other leading towns; will make the people of the sections more homogeneous, and will bring in more people to help us develop our great resources.

As every section of Arizona has at present newspapers to "spread the news," the Courier will, we hope, be pardoned for "coming home" and saying that with such mines as are in United Verde, Copper Basin, Big Bag, Peck, Walker, Turkey Creek, Weaver, Walnut Grove, Bradshaw and other districts, Yavapai county, of which Prescott is the capital, will, ere long, be shipping more gold, silver, copper and lead than any other county of the territory. When the railroad shall have been built, miners who at present take tools, food, everything, over rough mountain trails on the backs of animals, or in wagons, will be enabled to work low-grade mines. Just now it is only the richest mines that will pay to work, and with transportation, food, everything going slow at enormous prices, the wonder is that our miners can even "make ends meet."

The Mining Situation in Nevada County.

If Nevada county was off from almost any other place and was buried under twenty feet of snow for ten months of the year, during most of which while the thermometer stayed at forty degrees below zero; if during the summer season there were no trees in Nevada county to cast a shade, Nevada county would have now what is called a mining boom. Districts of country that are scarcely accessible and that have no comforts or conveniences have those booms, while at the same time they have not the fortieth part of a good showing of precious metals that Nevada county now has. But Nevada can be easily reached from any part of the world, has good roads over which travel is delightful, has trees and flowers and fruits and has a climate to which no reasonable person can object and therefore she has no mining boom, although she has gold in thousands of ledges and in many beds of gravel. Distance, difficulty and discomfort, give enchantment to a mining district and attract prospectors as well as capital.

While there is mining merit in Nevada county the miners here must show it up, and tell the world about it. Neither labor nor capital will come from a distance to hunt mines for our people. They will go to a new place on the bare report of a gold discovery, but not to an old place. When they are told that better mines are here they will naturally and sensibly say: "You folks have been there for a long time, and why do you not develop the mines you say can be developed?" Those distant people will acknowledge that we have an Idaho, Empire, Providence, Wyoming, Peabody, Magenta, New York Hill and other mines of which our history has often spoken, but when told that there are several hundred ledges held here, and by good titles, and are not worked, but which will pay when worked, those distant people and outside money will not believe. The only way is to work our ledges ourselves as best we can, show that they have in them the makings of mines and then capital will take hold.

We are glad to say this course is being more generally followed at the present time than has been heretofore the case. Eureka township has many quartz ledges in the vicinity of Graniteville (Eureka South) and some of them have paid well, notwithstanding which fact work ceased when the pitiful depth of one or two hundred feet was reached. The money taken from the mines was divided among owners and not carried over for the "rainy day" when heavier machinery was necessary. In Bloomfield township miners are looking at quartz, something they would not do a few years ago. Then they had too much gravel rich in gold to think of quartz mining. Now they have some promising locations on ledges, and are making some showing for having mines that will last, and to which a valley farmer cannot object. In Rough and Ready township, much good work is being done. Ledges that bear mineral are very numerous in that township, and they have only been worked far enough to have their croppings knocked off by a hammer. Washington township is known to have many large and innumerable small ledges. Wherever work has been done in Washington township good pay has resulted. The country rock there is similar to that of the paying part of Nevada City and Grass Valley districts. We think Washington township presents the best field for intelligent mining prospecting of any district on the coast. In Nevada City and Grass Valley districts (an imaginary line divides the two), much work by owners of undeveloped ledges is going forward in the proper way. The established mines are pushing ahead with explorations, and are using all the improvements of machinery and power which make mining more profitable, and which at the same time give employment to labor.

On the whole, we are very hopeful that a bright future is before this county, and that hope is founded on the good reasoning of practical men, who keep always alive to the situation. Moreover, that good future is close at hand.—Tidings.

Arizona Industrial Fair.

That the industries of Arizona are advancing may be inferred from the fact that there has just been incorporated an association for holding a Territorial fair at Phoenix. The name of the organization is to be "Arizona Industrial Exhibition Association," and the object is declared to be to "hold annual fairs or exhibitions for the display of all classes of domestic animals and fowls, and the various industrial products of all parts of the Territory. And to this end to lease or purchase a suitable tract of land for fair grounds; to erect all necessary halls, buildings, corrals, pens and stalls for the proper display of all classes of domestic animals and fowls, and all agricultural, horticultural and mineral products; all articles of husbandry and housewifery, and all manufactured articles, wares and merchandise."

Perhaps this announcement may arouse many who think of Arizona only as a torrid waste to revise their opinions. The Territory is advancing rapidly, and is building up a respectable agricultural interest in some parts. We trust the proposition for a fair will go forward rapidly and result in success worthy of such enterprise.

MECHANICAL PROGRESS.

Do Belts Need Rest?

A correspondent of the Boston *Journal of Commerce* says: Belts need rest just as much as a work hand, and room should be made to run off every belt at night with hoops to hold them where they will not become injured, unless it is a belt working on a loose pulley that is made smaller than the one with which it works. My reasons for so doing are that belts are elastic and continually stretching from the time they are first put in use, and if kept constantly under a strain their length will keep on increasing till they will at last break. Leather, from which the best belts are made will sustain a heavy load for a few moments, but will not pull back the strain if left under a continuous pull month after month. Its elasticity is such that it requires time for the belt to resume its former thickness when stretched till the parts separate. Each individual fiber, in assuming its new position as the belt is lengthened, suffers in thickness and not in a relation with one another, and, if time is allowed, the belt will shorten and thicken as the elasticity of each fiber has restored its effect of elongation.

It has been noticed in my experience, many a time, where a belt that would fail to drive a shaft at night would be ready to take hold in the morning, and perhaps would drive without any trouble for the greater part of the day. I know of belts that have never taken a rest in stretching from the time they were first put in use, that need to have about one-half inch removed every month to keep them from working slack, while others will work three times as long without removing any of the belt that has had a chance to restore the effect of stretching while removed from their wheels. The life of a belt, for this reason, depends on the time it takes for a given load to stretch it out to its breaking point, and since it has the power to restore itself in the amount of stretch, or to draw itself back into the shape and thickness it had to start with, it is simple enough to understand that every moment a belt has a chance to rest this drawing back adds to the life of the belt by giving it a chance to stretch over the same road again, and as long as we are able to give the belt a chance to restore at night what it has lost during the day, it is plain to be seen that they must wear out in some other way than by continually giving out by stretching.

I am well aware that a new belt stretches the most the first day it is in use, but this rapid stretching is soon over with. Belts will stretch in a short time all that they are going to until the fibres get settled down to their work, but from this point they will suffer elongation which their elastic powers are going to restore; and sometimes I have seen belts wound tightly on a drum or wheel that they may be ready to work when laced up for use. There is a load that a strap of leather will sustain which will never reach the breaking point the elastic power of the fibres are able to sustain, or the strain brought upon them; but when the belt is in motion these strains are changed about, sometimes acting on those of the inside layer, and then on the central ones, while being drawn over the smallest pulley, causing the interlaced fibres to work down between one another, and giving the belt a chance to stretch, which may partly itself while the belt remains on the pulleys. But in this case there is as much lost in one side or the other suffering compression, and from the driving stretch of the belt remaining under a severe tension when the machinery comes to rest.

If I had belts on every length of shafting, I would fix up some easy way of removing them at night, and of replacing them when the work is to be started in the morning, without injuring the leather by cutting over the sharp edges of the pulley, or by hanging on slender hooks, or stringing up by small cords to keep them from the shaft, and give them a chance to rest when they can do so as well as not, even if a belt was only to be used while the machine was in actual operation, and thereby save much power, for how often a belt is found that has been entirely worn out by grinding a loose pulley to death.

Properties of Brass.

The most important properties of brass compared with copper are the following: The color of brass is much brighter and more approaching to that of gold; it is more fusible than copper, less subject to rust, and to be acted upon by the vast variety of substances which corrode copper when cold, and more extensible than either copper or iron, and hence is well fitted for fine wire. Brass, however, is only malleable when cold. Hammering is found to give a magnetic quality to brass, and this circumstance makes it necessary to employ unhammered brass for compass boxes and similar apparatus.

The expansion of brass has been very accurately determined, as this metal is most commonly used for mathematical and astronomical instruments, where the utmost precision is required.

Most of the zinc readily burns off from brass when kept melted in a strong heat with free access of air. When the heat is equal to that of melted copper, the zinc takes fire and slowly burns away. At last, little else but copper remains, but still united with a small portion of zinc, which no further continuance of the fire will entirely separate.

Some kinds of very fine brass are said not to

be made by cementation, but by a more speedy and direct union of copper and zinc, care being taken to prevent the access of air to the materials while in fusion. Very fine brass may also be made by mixing together the oxides of copper and zinc and reducing them with a carbonaceous flux. Sage gives the following experiment to this purpose: Mix together 50 grains of the oxide of copper, remaining after the distillation of verdigris (which is very pure), with 100 grains of lapis calaminaris, 400 grains of black flux, and 30 grains of charcoal powder; melt the mixture in a crucible till the blue flame is seen no longer round the lid of the crucible, and when cold a fine button of brass is found beneath the scoria, weighing a sixth more than the copper alone, obtainable from its oxide in the same way, but without the calamine. This brass has a very fine color, like gold.

On this experiment M. Sage observes that there appears to be a point of mutual saturation between the two metals, which is when the copper retains one sixth of zinc, and this portion it will retain however long it is heated, provided the surface of the melted metal be covered to protect the zinc from the action of the air; but if the brass contains a greater proportion of zinc, precisely this excess will escape, even in covered vessels, and will burn when it comes out to the air. — *Reporter.*

A Metallurgical Triumph.

A very clever writer, Andrew Carnegie, gives the following racy description of how Messrs. Thomas and Gilchrist succeeded in devising their now famous process for eliminating phosphorus from iron. The story reads almost like a fairy tale. This writer says: "In making steel ten tons of molten pig iron are run into a big pot called a converter, and hundreds of jets of it are blown up through the mass to burn out the silica and carbon, and finally to make it steel. Now, phosphorus has a greater affinity for lime than for iron when it reaches a certain temperature, and when the air-blast brings the mass to the required heat, the million particles of phosphorus, like so many tiny ants disturbed, run hither and thither quite ready to leave the iron for the lime. In experimenting to get rid of the phosphorus, these clever young men (Thomas and Gilchrist) first put a lot of lime in the bottom of the pot as a bait, and into this fly the ants, perfectly delighted with their new home. The lime and slag float to the top, and are drawn off; but, mark you, let the temperature fall, and the new home gets too cold to suit these salamanders, although the temperature may be over 2,000 degrees—hot enough to melt a bar of steel in a moment if thrown into the pot. No; they must have 2,500 degrees in the lime, or they will rush back to the metal.

"But here lay a difficulty: 2,500 degrees is so very hot that no ordinary pot lining will stand it, and, of course, the pot itself will not stand a moment. If ganister or fire-brick is used, it just crumbles away, and besides this, the plaguey particles of phosphorus will rush into it and tear it all to pieces. The great point is to get a basic lining—that is, one free from silica. This has at last been accomplished, and now the basic process is destined to revolutionize the manufacture of steel; for out of the poorest ores, and even out of puddle cinder, steel or iron much finer than any now made for rails or bridges can be obtained, and the two young chemists, patentees of the Thomas-Gilchrist process, take their rank in the domain of metallurgy with Cort, Nelson, Bessemer and Siemens. These young men have done more for England's greatness than all her kings and queens and aristocracy put together."

It is claimed by many builders that wood joists, encased in plaster, are proof against any ordinary fire, and for many reasons are much preferred by them to the ordinary regulation fireproof iron joists. Strips are attached to the joists, over these strips irons are run, and on these the plaster is spread. The theory is that in any ordinary fire these joists thus treated will be fireproof, and only when the fire has reached such a fury that the building must go anyway will they be affected. Here comes in one of the advantages claimed for them. When a building is being burned by a furious fire the iron joists expand and crush out the walls, and do other damage. The wood joists would simply be burned up without injuring the walls at all.

CASTING A HEAVY GUN.—On May 6th, the largest gun ever constructed in this country was cast at the South Boston Iron Works, in fulfillment of a contract with the Government. When completed the gun will be about thirty feet in length, of twelve-inch rifle, weighing 212,000 pounds, and worth \$28,000, about half the sum that a steel gun would have cost. It is calculated to be able to throw a projectile six miles. This company is also under contract to furnish to the United States a ten-inch wire-wrapped cast iron rifle gun, a twelve-inch rifled mortar, and another gun similar to the one cast, but shorter.

FIRE-PROOF CEMENT.—(1) Iron filings, 140 parts; hydraulic lime, 20; quartz sand, 25; sal ammoniac, 3. These are formed into a paste with vinegar and then applied. This cement is left to dry slowly before heating. (2) Iron filings, 180 parts; lime, 45; common salt, 5. These are worked into a paste with strong vinegar. The cement must be perfectly dry before heated. By heating it becomes stone hard.

SCIENTIFIC PROGRESS.

A New Theory of Magnetism.

While it is now considered by scientific theorists as established beyond peradventure that the various manifestations of energy that we call light, heat, electricity, etc., are simply so many different modes of motion that affect the ultimate particles of which matter is composed, there is still much doubt and speculation as to the character of these motions, their mode of propagation, transference, etc. Especially is this the case with the peculiar manifestation of energy known as magnetism, which has been the puzzle of many master minds in science. In spite, however, of much ingenious speculation, it may safely be affirmed that no theory has yet been advanced sufficiently satisfactory to account for all the facts.

These remarks are apropos to a lecture lately delivered by Prof. D. E. Hughes, of microphone fame, before the London Society of Telegraph Engineers and Electricians, on the "Cause of Evident Magnetism in Iron, Steel, etc.," and which will take rank in the future, we believe, as one of the most important contributions to physical science that has been made in our day. They are summarized by a contemporary as follows:

Mr. Hughes was led to the long series of investigations, which finally culminated in the formulation of a new theory of magnetism, by some unexpected observations which were inexplicable by any of the current theories, and proceeded step by step experimentally verifying his position as his investigations proceeded, until he has finally succeeded, beyond question, in proving the complete inadequacy of any of the theories already promulgated to account for his observed facts; and, furthermore, he has advanced a new theory to account for the cause of evident magnetism, which is not only in harmony with our knowledge of the subject, but which is likewise substantiated by an imposing array of new and ingenious experiments which present many new and unexpected phenomena which are quite inexplicable by any of the theories now entertained.

The result of Mr. Hughes' investigations are attracting much interest among scientists, and are of decided importance as affecting our conceptions of the conditions under which one of the most interesting forms of energy manifests itself. The conclusions which he announces are as follows:

1. That each molecule of a piece of iron, steel, or other magnetic metal, is a separate and independent magnet, having its two poles and distribution of magnetic polarity exactly the same as its total evident magnetism, when noticed upon a steel bar magnet.
2. That each molecule, or its polarity, can be rotated in either direction upon its axis by torsion, stress or physical forces, such as magnetism and electricity.
3. That the inherent polarity or magnetism of each molecule is a constant quantity like gravity; that it can neither be augmented nor destroyed.
4. That when we have external neutrality, or no apparent magnetism, the molecules, or their polarities, arrange themselves so as to satisfy their mutual attraction by the shortest path, and thus form a complete closed circuit of attraction.
5. That when magnetism becomes evident, the molecules or their polarities have all rotated symmetrically in a given direction, producing a north pole if rotated in that direction, as regards the piece of steel, or a south pole if rotated in the opposite direction. Also, that in evident magnetism we have still a symmetrical arrangement, but one whose circles of attraction are not completed except through an external armature joining both poles.
6. That we have permanent magnetism when the molecular rigidity, as in tempered steel, retains them in a given direction, and transient magnetism whenever the molecules rotate in comparative freedom, as in soft iron.

These experiments do away with the theory of Coulomb and Poisson, that each molecule is a sphere containing two distinct magnetic fluids, and a peculiar coercive force. The theory of Ampere that elementary currents flow around each molecule is shown to be equally illusive.

The inherent polarity of magnetic metals is sought to be proved by numerous experiments. The Professor says: "We might suppose from the theory which I am advocating that upon the rotation of the molecules there would be some disturbance or mechanical trepidation; and such is found to be the case, as first observed by Page, and afterwards verified by Dr. Joule and De la Rive, in the molecular sounds produced in iron upon its magnetization. Reis's first telephone was founded upon the sounds, and Du Moncel has made numerous researches upon this subject. In the last of my experiments, the sounds were too feeble to be heard, but by the application of the microphone these trepidations at once became audible."

One of the most interesting conclusions that Prof. Hughes believes himself justified in announcing from his experiments, is the discovery of a peculiar property possessed by a magnetic body, and which he explains as follows: "That not only can the molecule be rotated through any degree of arc to its maximum or saturation, but that while it requires a comparatively strong force to overcome its rigidity or resistance to rotation, it has a small field of its own, through

which it can move with excessive freedom, trembling, vibrating or rotating through a small degree with infinitely less force than would be required to rotate it permanently on either side. This property is so marked and general that it can be observed without any special iron or apparatus."

It is not improbable that the further development of this highly interesting and original series of experimental researches may lead to the discovery of simple means, whereby the character and quality of iron and steel may be determined without the intervention of the present tedious and troublesome chemical and mechanical tests—indeed, the lecturer held this suggestion to be most probable. Furthermore, it is not improbable that much light may be thrown upon the cause of these inexplicable changes in the molecular structure of iron and steel, which are of such grave importance when considered in relation to the very general uses of these metals for various constructive purposes.

BACTERIA ON SMALL COINS.—The *Frankfurter Zeitung* informs us that Dr. Reusch has found, as the result of a long series of minute investigations, that the surfaces of 50-pfening pieces (sixpences), which have been long in circulation, are the home and feeding ground of a minute kind of bacteria and vegetable fungus. An extended series of observations showed that this is the case with the small coins of all nations, the thin incrustation of organic matter deposited upon their surfaces in the course of long circulation rendering them very suitable for this parasitical settlement. Dr. Reusch scraped off some of these incrustations, and with a small scalpel divided them into fragments, which were subsequently dissolved in distilled water. The employment of lenses of very high power showed the bacteria and fungi distinctly. This is a matter of no little importance from a hygienic point of view. It has now been conclusively established that bacteria form the chief agency in the propagation of epidemic disease. The revelation that they have a chosen domicile in the most widely circulating medium which probably exists in the world, presents us with a new factor in the spread of infectious disease. There is, however, a remedy. Where coins have been in circulation for a number of years, if they are washed in a boiling, weak solution of caustic potash, they will be cleansed from their organic incrustation, and so freed from the unwelcome guests which they harbored.

MANGANESE IN MARBLE.—M. Dieulafoy has shown that manganese in the state of bicarbonate exists in the waters of all seas and oceans; and M. Berthelot has pointed out that in contact with oxygen, this bicarbonate becomes binoxide. It follows that oxides of manganese must be produced in large quantity in the ocean, and sinking by their weight must accumulate on the ocean bed. This corollary explains the existence of the large quantities of binoxide of manganese concretions and mangiferous mud found in the sea bed. It also explains the existence of manganese in the French and English chalks of the secondary period; also the fact recently discovered by M. Dieulafoy that the well known artistic marbles of Carrara, Paros, and the Pyrenees are comparatively rich in manganese. There are two kinds of Carrara marble: the ordinary, which has a bluish tinge on fracture, and the statuary marble, which is very pure and white. The well known chemical reaction showed manganese in both kinds. Parian marble, which has larger grains than Carrara, also showed manganese in even greater proportion than the Carrara; and the Pyrenean marbles, which resembles the Carrara in being of two qualities, also contain manganese in about the same proportion. The agreement in proportion seems to indicate a similarity of cause for the presence of the manganese.

ANALYZING DRINKING WATER.—A contemporary gives the following simple method for analyzing common drinking water: Place the water in a clear bottle, and first examine if it be colorless, and thus free from organic matter. Then taste it, and if no peculiar flavor is discernible, let it stand a day or two; then heat or boil, and if no odor is present, the water is in all probability, pure. If the presence of sewage contamination is suspected, fill a clean pint-bottle three-fourths full of water, dissolve a teaspoonful of loaf or granulated sugar, cork the bottle, and place it in a warm place for two days. If the water becomes cloudy or muddy, it is unfit for domestic use. If it remains perfectly clear, it is probably safe to use. If the water is sufficiently concentrated, it will give a blue precipitate with potassium ferrocyanide when iron is present, and a black precipitate with hydrogen sulphide if lead is present. It would be unwise to attempt these tests without some previous knowledge of chemistry.

SEEING A LIGHTNING FLASH.—Prof. Tait, of Edinburgh, insists that when people think they see a lightning flash go upward or downward they must be mistaken. The duration of a lightning flash is less than the millionth part of a second, and the eye cannot possibly follow movements of such extraordinary rapidity. The origin of the mistake seems, he says, to be a subjective one, viz.: that the central parts of the retina are more sensitive, by practice, than the rest, and, therefore, that the portion of the flash which is seen directly affects the brain sooner than the rest. Hence a spectator looking toward either end of the flash very naturally fancies that end to be its starting point.



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Passing Events.

It is worthy of note that the late news from the Coeur d'Alene region indicates rather the discovery of ledges than the opening of any larger area of placer ground than was known last fall. It is too soon, of course, to form a very correct judgment of the value of these quartz discoveries, but the claims will be actively developed.

The legal holiday of "Decoration Day" was very generally observed this year. Not only has it become the custom to decorate on this day annually the graves of the soldiers of the war, but families take the occasion to visit the cemeteries and place flowers on the graves of deceased friends and relatives.

So far this spring, although there are many prospectors in the mountains, no discoveries of any special note, which are liable to open up new areas of any extent, have been made.

The announcement that ex-Governor Stanford, of this State, proposes establishing a school on his extensive property at Palo Alto, San Mateo county, where young men may receive an "industrial education," is received with pleasure. His abundant means will permit of his establishing an institution which should be of great value to the industrial classes.

STATE MINERALOGIST.—The Governor has re-appointed Mr. Henry G. Hanks State Mineralogist of California. The funds of the Mining Bureau are quite low, so much so that the Governor has suggested moving the mineral collection to the Capitol building, at Sacramento, to save rent, in which case the mineralogist would simply keep a business office in this city. It is to be hoped this will not be done, however.

Smelting Native Copper Ores.

The product of the Lake Superior copper mines reaches the lake smelting works in one of three forms—masses, barrel-work, or concentrates. The masses, from the veins only, sometimes exceed 10 tons in weight. Barrel-work is the larger lumps, and the concentrates average between 70 and 75 per cent. As the mineral is free from sulphur, arsenic and antimony, it is only necessary to smelt it with from 6 to 8 per cent of limestone and 10 per cent of rich refinery slag, skim off the slag and refine the metal.

The mass copper furnaces have a removable roof, lifted by a crane, to admit the mass. The charges of barrel or stamp work are thrown in with the fluxes by a side door. About 75 per cent of the copper is ladled out in ingots, and 25 per cent passes into the slags. The refinery slags are returned to the furnace with the next charge, the poorer being run down in a cupola.

The cupola charge consists of 20 tons of slag, containing about 4 per cent of copper, 8 to 9 tons of limestone, and 6 to 7 tons of anthracite coal. The yield of the cupola is slags poor enough to be thrown away and cake copper fit for refining. Mr. James Douglas, Jr., describes the cupola used as a modified McKenzie with an annular tuyere five-eighths of an inch wide, encircling the furnace below, and a slightly conical water-breast, 22 inches high and 25 inches above the hearth. Upon the water breast rests the brick body of the furnace, 8 feet 8 inches high to the charging door, elliptical in shape, being 7 feet 9 inches by 5 feet 8 inches. The brick lining immediately above the bosh supplies the iron of the slag with silica, and is so rapidly consumed that a 10 or 12 hours' run is almost the limit of its life. During these short campaigns 20 tons of slag are put through.

The construction of the Lake Superior refineries, if we except the removable roof of those used for the mass copper, does not differ materially from that of the ordinary Swansea furnace, but special valves and deflecting plates are employed to throw the air through vents in the bridge on to the charge. The ash-pits are provided with doors, and a low-pressure blast is used beneath the fire-bars, so as to control the admission of air and the character of the atmosphere within the furnace.

Estimation of Slags.

In the early stage of smelting at Leadville great difficulties were encountered at most of the works in making a good slag, and the "muscular" method had to be frequently resorted to in freeing the furnace from sows. This evil was in great part due to disregarding the alumina contained in the ore, and also to the manganese which was not regularly determined on account of the tedious methods then in use. The result of this oversight was a very basic slag, which would naturally close up the furnaces. Mr. T. Macfarlane, in a paper read before the American Institute of Mining Engineers, suggested that by determining the specific gravity of a slag, a clue might be obtained for improving it if not correct. If the specific gravity were higher than that of the typical slag this would prove an excess of the bases of the heavy metals in the faulty one. But whether it required an addition of silica or lime, or both, the determination of the specific gravity could not tell us. In the case of a slag which is far out of the way, correct chemical analysis alone, however tardy it may be, can give us information. Since the introduction of the more rapid volumetric method for the determination of manganese (for example, Guyard's), and the estimation of the alumina in slag computations, all troubles of this nature have ceased.

A fact to which Dr. Iles, of the Grant Smelting Works, and which it appears might be turned to account in correcting a slag, is the behavior of its metal under the magnet. Some slags are highly magnetic, while others are not. Would this not indicate that magnetic oxide is dissolved in the slag which has escaped reduction by ferrous oxide, and thus causes a waste of precious flux?

At the delinquent sale this week of the Ophir Mining Company 7,138 shares were sold for non-payment of the assessment. Of this amount about 3,500 shares were taken in by the company.

Averages in Mine Accidents.

Official statistics show that during the past fiscal year there has been a less number of deaths by accidents in the coal mines of Great Britain than before. This shows, too, that over a period of years the loss of life by accident in and about the mines has decreased, but the decrease is rather in proportion to the number of persons employed, and especially to the production of minerals from the mines, than in the actual number of lives lost. In the 20 years embracing 1861 to 1880 the average number of lives so lost was under 1,100; last year there were 46 under that number; but the number of persons employed and the tonnage of coal and other mineral raised have both been enormously increased, so that, though the number of lives actually lost is not greatly reduced, the safety in the mines in proportion to the employment afforded therein and to their yield is very greatly increased.

Last year there were 921 separate fatal accidents in these mines, as against 876 in the year 1882. The total loss of life is reported as 1,054 for the year 1883, and 1,126 for the previous year. There were 25 explosions of firedamp, with a loss of 134 lives, last year, as against 35, with a loss of 250 lives, in the previous year. But more lives were lost in consequence of falls of roofs and slides in the mines—469 last year, against 468 in the preceding year. The loss of life in the shafts of the mine was less—97 against 116; but the lives lost from explosions of powder, by machinery under ground, and other causes in the mine, rose from 208 for the year 1882 to 246 for the past year. The loss of life at the mines on the surface was also greater, the increase being due in part to a greater loss from machinery, the total loss of life on the surface being 108, instead of 84, as in the year 1882. There is, therefore, a considerable reduction in the loss of life from great mining accidents, but the loss from smaller and single accidents shows a slight increase on that of the previous year. The number of persons employed in and at the mines was, however, considerably increased during the year, the total being 10,000 more than in the year before, and thus, while in the year 1882 there was one death by accident for every 447 persons employed, last year there were 448 persons employed for every such death. This percentage of accidental death, though improved during the year, is still considerably above that in and about the metalliferous mines, which are separately reported on, in the same year.

Construction of Bratticings.

To divide a mining shaft a central "brattice" is used so that upcast and downcast air currents will result. For temporary purposes a brattice may be readily constructed as follows: "Buntions" as the English miners call them, are pieces of wood fixed across the shaft at intervals. These are generally two-inch stuff four or five inches wide. These are secured in any suitable way to the shaft timbers. One or two thicknesses of brattice cloth or painted canvas is nailed to the buntion and the brattice is complete at a small cost. Instead of the brattice cloth, ordinary inch plank nailed to the buntions can be used. The same kind of brattice, if required permanently, may be made of buntions three inches thick and five inches wide covered with two inch planks tongued and grooved, or having their joints covered with narrow slips one inch thick. But this costs twice as much as that first described.

One of the best forms of brattice is that known as the "plank brattice." It consists of a succession of three inch planks, placed across the shaft, buntion fashion, resting edge on edge, and kept in place by a double series of stringers. If the plank brattice is to be applied to a shaft lined with metal tubing, grooves for the reception of the planks may be cast in two rows of the tubing plate.

FOLLOWING are the latest observed temperatures in the Sutro tunnel: Tunnel entrance, air, 72; water, 111; shaft No. 1, east, 88; west, 96; shaft No. 2, east, 82; west, 52; shaft No. 3, 87; shaft No. 4, 75; Combination shaft connection, 65; Osbiston shaft connection, 100; C. & C. shaft connection, 81; Julia shaft connection, 99; Yellow Jacket shaft connection, 72; Forman shaft connection, 80. Flow of water in standard gallons, per day, 9,683,800.

Freezing Water in Mine Shafts.

Some little time since we gave an account of a system of freezing water in mine shafts. It was stated that the system was applicable in such places where quicksand existed, but its most particular utility was in sinking through water-bearing strata in shafts. A practical experiment is about to be made on the continent, in a difficult sinking. The system is called the Poetsch, after the inventor. The shaft has been carried down to a bed of quicksand, and in spite of persistent attempts to pass through it by means of piling, the efforts of sinkers have ended in failure. The work had actually been abandoned, when the representative of the Poetsch system offered to undertake the task. The offer was readily accepted, and the work was commenced without delay. Already the tubes have been put down, and the freezing apparatus will soon be in operation. This will be a severe test of the system, for the conditions are particularly unfavorable for its adoption. To take in hand a sinking that has already been carried down to the waterhead is to place the system at a great disadvantage. For want of space it cannot be worked in its entirety, and the operations of excavation are seriously impeded. This was the case in the first application. When the sinking is begun with the intention of applying Poetsch's system, as soon as the water-bearing stratum has been reached, it is to be laid out to the requisite dimensions. In such a case the inner and the outer row of freezing pipes may be properly placed, and there is room for the sinkers to work freely.

There was talk of this system being tried in England, but insular prejudices prevented a test. Mr. Andre, the gentleman who first called public attention to it, says numerous correspondents from this country wrote to him for information concerning the system, but in England no one paid any attention to it. This fact is cited by Mr. Andre as a sample of our "wide-awakeness," or a desire to be kept informed of all that is going on in the world, and especially of new inventions.

Bismuth.

There are a number of localities on this coast where bismuth is found. The usual ore is a sulphide. This ore is found in small quantities as a sulphide in a large proportion of the refractory ores of the Rocky mountains, and in considerable quantities in certain veins in Boulder and La Plata counties, Colorado. The production of metallic bismuth in the United States has thus far been of no importance. The ores, which in small quantities at least, are widely distributed in this country, give promise that in future the production of bismuth may become a regular industry. The metallurgical processes for the extraction of the metal from its various ores are quite simple.

The Tucson (Arizona) Index has been shown a grayish green impure oxide of bismuth, carrying about 8 per cent to 10 per cent, and found within a few miles of Tucson. There is no doubt that many of the so-called iron ledges are a bismuth oxide, of a grayish, greenish or yellow white color, often of an earthy nature, and would be called carthy ochreous varieties of iron. It is also associated with magnetite, and forms a carbonate incrustation on many iron ores. It exists as a sulphide in acicular crystals of a lead gray color. Telluride of bismuth has been found in two or three localities in Arizona. It is often found associated with gold, is of a steel gray color, and is both massive and granular. By the most simple and inexpensive tests the assayer can discover the presence of this metal.

THE California Commissioner to the New Orleans World's Fair, Colonel A. Andrews, will call together the Board of Trade, Chamber of Commerce and other organizations to devise means to raise funds for a proper display of the State's productions at New Orleans. He has received a letter from E. N. Burke, Director-General of the Exposition, in which that gentleman says he will recommend that the management of the Fair subscribe \$5,000 to that end. Colonel Andrews says \$15,000 more will be necessary to make a proper display.

PREPARATIONS are being made at Brandon, Coos county, Oregon, to destroy the sea-lions, which are a great detriment to the fishing interests on the Coquille.

Lower Wood River.

In the last number of the PRESS was given a map, showing the Upper Wood River mining region, Idaho, and we herewith present one which shows the Lower Wood River mining country, where most of the mining work is going on. The principal mining towns of the region—Ketchum, Hailey and Bellevue and their surroundings are here shown. So much can be said about the Wood River mines, that it is difficult to know where to begin. Ordinarily mining districts—at least the productive sections of them—are of limited extent and easily described. The paying properties are situated but a short distance from a given center; they can be enumerated on the fingers of one hand, and may be all visited in one day. Until the discovery of the great mineral belts of the Wood River country, Leadville was the only exception to this rule. In that famous region the mines were within a radius of a few miles, all located on the same body of mineral, or on spurs or shoots from it, and a description of one, except as to extent, would answer for the others. At Wood River, however, is an extent of mineralized country, which, as far as at present explored, is shown to be not less than seventy miles long, by nearly twenty in width, abounding in lead and silver, throughout its whole extent. Besides this mineral zone, which stretches from Bellevue to the Smoky, is another belt of similar, if not identical character, reaching from a point on Little Wood River, in the vicinity of Muldoon, to a point some miles northwesterly from Ketchum, a distance of perhaps fifty miles, where it unites with the first mentioned belt, forming an immense triangle. This second belt is of varying width from three to ten miles, and, in the opinion of competent judges, is in no degree inferior to the other.

There are a number of mines near Bellevue now being developed. Among the prominent ores are the Minnie Moore, Penobscot, Mammoth, Michigan and Star. The Ornament group is 10 miles west of Bellevue. The mines in the valley of Rock creek, and on the streams that lie west of it and flow into Camas creek, a tributary of Wood river, are gold bearing as well as rich in silver. On the east or Bellevue side of Wood river there are a number of promising mines on Lookout mountains. The town of Hailey is five miles north of Bellevue. On Croy creek, 7 miles west of Hailey is Bullion district, the principal mines of which are the Idahoan, Bullion, Jay Gould, Mayflower and Eureka.

Sixteen miles up Wood river from Hailey is the town of Ketchum, the central point of Warm Springs District. The district extends from Deer Creek on the south to Galena on the north, and comprises the mines on the East Fork of Wood river, Trail creek, Lake creek and Boulder creek, east of Wood river and Warm Springs creek, and the whole section of country west from Wood river to the Big and Little Smokies. The district is one of the most promising in Idaho, if not the foremost. The operation of the smelters of the Philadelphia Mining and Smelting Co., providing a market for the ores, has been one of its prime factors of success. We have from week to week been chronicling in our mining summary the doings at the various mines in that region, and it is not necessary to here enter into details. The whole region is a very rich and prosperous one. Large quantities of ore are shipped from here, and very many rich mines are being developed.

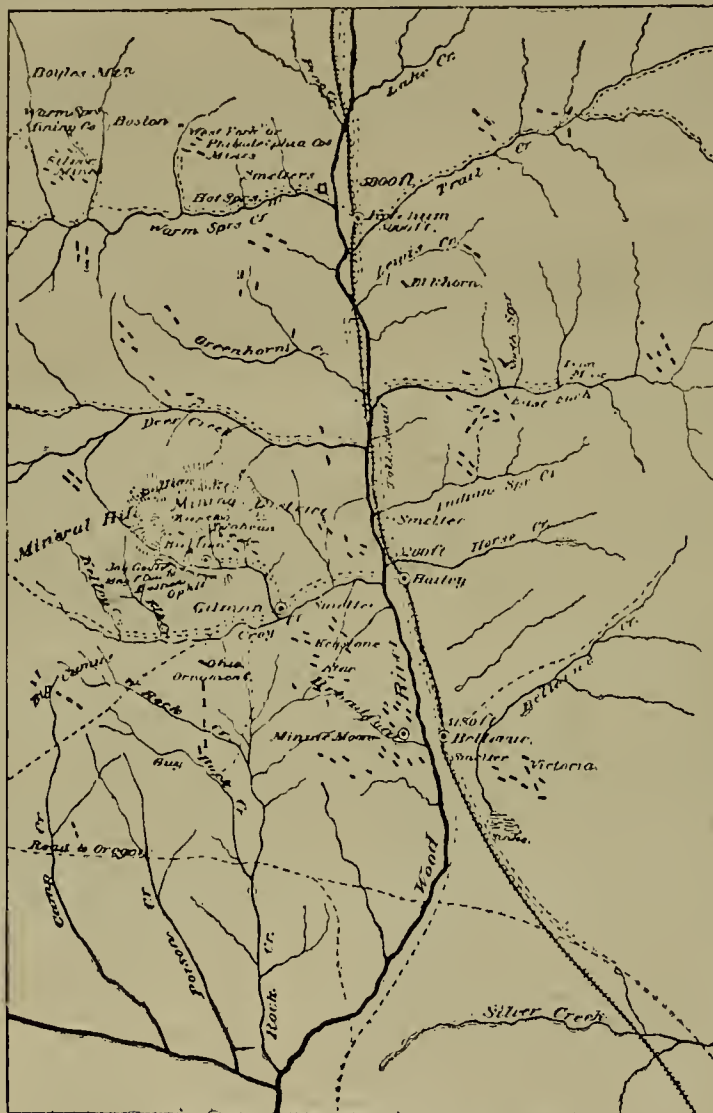
Concerning Ketchum and its surroundings, the *Keystone*, published at that place, has this to say:

"Ketchum is situated in the heart of the Wood River mining region, on a beautiful town-site plain at the confluence of the Trail creek and Warm Springs creek with Wood River. The town site borders the two latter streams, and is surrounded at distances of from a half to one mile by fine grazing hills and timbered mountains. The great Challis country is a tributary via Trail creek, the Sawtooth and Salmon regions of many mines via Wood River to the north, and the Warm Springs creek and Smoky regions via Warm Springs creek to the west. These several districts are all rich in mineral possessions, and present the brightest prospects for rapid development. Their only means of transportation is via Ketchum. The famous Elkhorn, Parker, Noonday and Baltimore mines, three miles east, the Irvine, Ontario, West Fork, and Black Horse several miles west, the Vienna,

Mountain King, Lyon, Solace, Emma, Silver King, Pilgrim, Lucky Boy and many others to the north, besides hundreds of smaller mines, and we dare say, thousands of prospects, all are tributary to, and dependent upon, Ketchum as a supply and transportation centre. Timber, water power, quarries, limestone, brick clay and everything calculated to encourage the building up of a flourishing city are here abundant, lending their inducements of economy in addition to the vast resources of mineral wealth of which we can be proud.

"Ketchum has the only smelting works on Wood River, and these, with a daily capacity of 180 tons will be enlarged as the time demands. We have a greater number of rich mines than any other vicinity. All those mentioned above as lying east, west or south are preparing to contribute largely to the local smelting works, while others are now keeping

with a heavy growth of pine, which interpose the most discouraging obstacles to the search for veins. The labor of prospecting has been so great, coupled with the shortness of the seasons, that it has nowhere, except in the immediate neighborhood of the best mines, received that careful study and scrutiny which has been devoted to other and poorer sections. Since the first year—when most of the discoveries were made by men on horseback—there have been comparatively few prospectors here. While the hardy class of men who find our mines are inured to toil, and are accustomed to all manner of privations incident to life in a wilderness, they shrink from a use of the pick and shovel when there is nothing but an indication in sight. In no other way will the wealth of these mountains be uncovered. An occasional accident brings the coveted ore to the light, but the country waits and waits intelli-



MAP OF LOWER WOOD RIVER, IDAHO.

stamp mills in operation in the Sawtooth country. The Elkhorn, Parker, Baltimore, Noonday, Ontario, Blackhorse and Irvine will probably be the largest shippers here this year. The Elkhorn alone netted \$50,000 in one month last season. We have much to expect from the East Fork of Wood river, six miles east, and from Greenhorn gulch, six miles west. These districts are new, but promising. The former is already famous for iron, having supplied the Philadelphia smelters with fluxes for two years."

In the last number of the *Wood River Times*, published at Hailey, is an article on the mines which gives a good general idea of the region: "In the early history of mining in Idaho the prospecting was exclusively for gold, and later, when the silver deposits in Owyhee county and some few other places were attracting attention, the hostility of the Indians who were roaming through the country effectively prevented its examination. Its great wealth, therefore, lay concealed from the world until the summer of 1833, since which time the prospector and miner have been almost daily bringing in proofs of its wonderful richness and unprecedented compass. Unfortunately, it is not an easy country to prospect. Everywhere it is covered with deep soil and detritus, and in many places

gent and diligent prospecting, and when it receives it it will astonish the most sanguine."

"In no other country in the world are the ores so rich as here. There are a few isolated instances of mines yielding richer ore, but comparison with such is unfair. Galena, which yields 120 ounces of silver has always been considered exceptional. There were 86 different mines which contributed ores to the Philadelphia Works the last two months of the past season and the average of them all was 143 ounces silver and 60 per cent lead. This result challenges comparison. The yield of the Leadville ores is, at present, less than 20 ounces. High freights and a fluctuating lead market are practically immaterial factors, but under the most adverse circumstances, the lead in our ores will pay for extraction, reduction and transportation, leaving the net yield in silver per ton still greater than that of any mining district in America. No place ever offered better inducements to mining men than this, whether they be rich or poor. A man with a hundred weight of ore can get its value with the same facility that a placer miner can sell an ounce of gold dust. The poor man with a claim which yields a little ore is as independent of capital as the farmer who subsists upon his own crops.

The Assessment Plan.

They are beginning to find out in Colorado and elsewhere, that the non-assessable plan of organizing and carrying on mining companies is not entirely what was claimed for it. They think now that what is known as the "California plan" of assessing people in proportion to the stock they own, has some good features after all. There are many good mining properties in Colorado, suffering from temporary embarrassment, which would now be working and perhaps making money for the owners, was their stock assessable. We tried this plan a long time ago in this State, and found it would not work. It was our experience which led us to adopt the assessment plan. There are defects in it of course. The main one is the freezing out process of continually assessing until small holders drop out. It takes time to levy and collect assessments and we do not have much of "freezing out" in these days. It is a good thing to be able to make every owner pay his share of the expenses or else sell out. As we have said the plan has been abused in some instances, but it is, nevertheless, the best that has been devised for developing mining properties. With stock forever non-assessable it is hard to get men to pay any money for having work done when the money paid for the stock is once spent. A few remarks of the *Colorado Mining Review* are to the point on the subject.

The plan of forming mining companies whose stock may become assessable is being talked of quite generally among those interested in the formation of new companies. Judging from the expression of opinions, we would not be surprised if quite a number of future corporations in Colorado, would organize under laws of States which are favorable to the assessment plan. While the non-assessable plan has prevented numerous swindles from being perpetrated by companies organized under Colorado laws, it has quite as often served as a bait to catch the ignorant with. The words "forever non-assessable," printed conspicuously on the face of certificates has been the ignis fatuus which lured many into heavy losses, who supposed that in making a purchase they were getting something that would yield a profit with only the trifling expense of the original cost. Although not fully advocating the assessable plan in all its features, there are many things about it which command our respect and attention. We have actually known of good mines lying idle and failing to receive the required annual assessment because of a refusal of the stockholders to pay for having it done. Under the non-assessable plan they could not be obliged to pay for it and hence, marvelous as it may seem, they would not do it, but allowed the property to pass into the possession of relocators. The Colorado law could be framed so as to permit persons to organize upon an assessable basis if they so chose. We venture to say that as much "freezing out" is practiced under the operation of one plan as the other.

Technical Training.

Ex-Governor Leland Stanford, President of the Central Pacific Railroad Company, has announced his intention of founding and endowing in this State an institution for free technical education. It is to constitute a monument to the memory of his only son, recently deceased. It is to be entirely independent of any other institution, and the founder hopes to establish it on a basis which will make it of a practical character, no higher education—as it is usually defined—being aimed at. To use the Governor's own words, "I propose that boys and girls—for it is to be for both sexes—who enter the institution, and who take a full course, shall when they come out know some business or trade so thoroughly that the question of bread and butter shall not be a stumbling-block to them on their entrance into life."

This indicates an intention to give the institution a broad scope and to confine it more particularly to industrial instruction. It has been within Governor Stanford's experience to have met many young men, highly educated, who knew no practical thing which would give them a living without gaining the experience at the expense of the employer. He wants to found a school which will give young persons some practical knowledge. He is now visiting the more prominent educational establishments in the East with a view of gaining information as to their practical workings. No more valuable donation to the people of California could be given than an institution of the kind proposed. With ripe judgment, abundant means and a desire to thoroughly accomplish his object in a practical way, Governor Stanford can do great good to the young people of this State, and we are glad to see him turn his wealth to so practical an account.

Borax.

No where in the United States have any considerable deposits of this valuable salt been found except in California and Nevada, where it occurs at a number of localities, in some of which it is found sufficiently concentrated to render them available for working. In some of the hot springs in the Yellowstone Valley, Montana, boracic acid forms occasionally as much as 6 per cent of the residue on evaporation, but generally the tenor is less than 1 per cent. The first discovery of this mineral in California is due to the late Dr. John A. Veatch, a close student and careful observer, who, as early as 1856, having detected the presence of boracic acid in the waters of certain mineral springs, followed up this clue, visiting many similar springs and various salines, until at last, after much search and many disappointments, he came upon quite a large deposit of borax resting in the bed and about the margin of a marsh or pond, situated on the easterly border of Clear Lake in Lake county, California.

The finding of this deposit was not the result of mere luck or accident, as has so often been the case in the discovery of valuable mineral deposits. Dr. Veatch, being thoroughly informed as to the conditions under which the salt is apt to occur in nature, after having his interest awakened by meeting with some traces of it in his travels, sought long and diligently for those peculiar salines which usually constitute its habitat. Many months were spent in going from one alkali flat or group of thermals to another before his researches were rewarded with even a partial success, for such, in the light of subsequent events, is all that can be claimed for this first find on the border of Clear Lake.

The more available portions of this deposit consisted of solid semi-opaque crystals imbedded in the mud at the bottom and around the edge of this pond, the mud itself and the marshy soil in the vicinity being also impregnated with borax, both in the form of minute crystals and as boracic acid. Only near the center of the pond, however, were the crystals found of large size and in great abundance. Here they occur to a depth of 10 feet in a tenacious blue clay, covered with a foot of softer mud. In this stratum of clay the crystals varied from a few grains to ten or twelve ounces in weight. Elsewhere they were found much smaller, the most of them being of microscopic fineness.

Following the Veatch discovery the California Borax Company was formed for working these deposits, the only material attempted to be utilized consisting of the larger crystals imbedded in the mud near the center of the lake. The method of operating employed by this company was as follows: The mud from the bottom of the pool was lifted by a dredging machine and emptied into large vats, through which a stream of water, raised by Chinese pumps, was kept constantly flowing. This stream, carrying off the mud, left only the large crystals, freed from all impurities, behind. The crystals thus obtained were then dissolved in boiling water, and afterwards recrystallized in lead-lined vessels, producing, without further manipulation, an article fit for the market. Although this was a most wasteful method of collecting the crude material, all the finer crystals and much boracic acid contained in the mud flowing back into the lake, the company found no economy in attempting to save it more closely. Had they not been misled on one or two vital points, the company would probably have worked their deposits more carefully than they did from the outset. In the first place they greatly overestimated the quantity of these larger crystals at the start; then too, these crystals, after the original crop had been removed, reproduced themselves much more slowly than had been expected. Between these two sources of error the company, as time wore on, found their stock of the crude material shortening at a rate which would eventually have forced them to curtail operations, an event that was precipitated by the heavy rains of 1866 and 1867, which so filled up the lake that but little was done thereafter. The discovery of the more prolific Nevada deposits a few years later so reduced the price of borax that the California company, soon after the mishap mentioned, ceased operations altogether, being unable to manufacture the salt at the low rates so brought about. During the period of their active existence this company produced about 300 tons of refined borax annually, which was sold in San Francisco at an average of 25 cents per pound.

The Principal Borate Fields of Nevada.

The borate fields are situated in the extension salines known as Teel's marsh, Rhodes' marsh, the Columbus marsh and Fish Lake valley, all in the south-easterly part of Esmeralda county. These salines consist of oval-shaped alkali flats occupying the centers of immense basins, and cover from 10,000 to 20,000 acres each. These basins are surrounded for the most part by a broad margin of sage plains which rise gradually to the base of the hills and mountains which enclose them on every hand. They have no outlets, and, receiving the drainage of the country around, retain everything brought into them, including the borates and other salts of various kinds. From midsummer till late in the spring, when the snow commences to melt on the mountains, these saliniferous lands are, as a general thing, apt to be dry,

only shallow lakes occupying sometimes their points of greatest depression. At other seasons of the year portions of them are covered with water to the depth of a foot or two. Heavy rains, though these seldom occur in this region, convert these alkali flats into beds of tenacious mud, even a slight shower rendering their passage by teams difficult for the time being. Water can be obtained on these salines almost anywhere by digging from 2 or 3 to 10 or 15 feet below the surface. It is generally brackish, however, often so much so as to be unfit for drinking. By digging to much greater depth good water is obtained a short distance back from the edge of the marsh. Over large sections of these flats exist deposits of common salt, carbonate of soda and borax. This latter mineral does not however, occur here as at Clear Lake, California, in the shape of compact, semi-opaque crystals inclosed in mud, but generally in the form of borate of lime or soda. The former is found at many spots imbedded in these marshes from one to four feet below the surface. It crystallizes in long, silky fibres which gather into balls from an eighth of an inch to 2 or 3 inches in diameter. These globular masses have the lustre of white satin, and when dug up readily separate from the enclosing earth. The borate of soda mixed with sand and other impurities, accumulated on the surface in the shape of a dark colored incrustation an inch or two thick. This crust when dry, being hard and brittle, can be easily detached from the moister ground beneath and broken into fragments.

Fish Lake Marsh.

This is the most southeasterly saline of this group, and covers an area of some 10,000 acres, occupying the center of a basin three times as large. Commencing at the northern end of this marsh, or, rather, alkali flat, we come first upon a cluster of small mounds covered with a white incrustation from 6 to 8 inches thick, and carrying about 20 per cent boracic acid and 45 per cent of other soluble salt, the surface soil in this portion of the flat being also slightly charged with similar substances to the depth of several feet. A good deal of the crude material could be, and, in fact, has been collected here without much labor. A little further on is found a patch of nearly 100 acres covered with an efflorescence of the various salts—borates included—and which, being moist, flaky, and of a dazzling whiteness, might easily be taken for fallen snow, the illusion being strengthened by the manner in which this stuff can be compressed into balls that harden, still retaining their forms after the moisture escapes. At this spot the borates mixed with the chloride of sodium, soil and other impurities can be gathered up without much trouble.

Proceeding south, a patch of forty or fifty acres is crossed, when the borates of lime and soda lie on the surface, but so mingled with the grass, roots and earth that much worthless stuff would have to be taken up in the process of gathering them. This, when attempted, is usually done with a broad wooden hoe. Continuing in this direction, we arrive successively at several large tracts, the whole embracing 400 or 500 acres, where the borates occur, either in the form of an efflorescence on the surface or imbedded in the ground. On some parts of these tracts, and over large areas outside of them a thin crust of borate of soda covers the surface; the most of it, however, is too low-grade to be of present value. Scattered over this saline are numerous small spots, rich in the borate of lime, and from which a good deal of this material has already been taken. What is here said of the borate deposits in Fish Lake valley will apply largely to those elsewhere in the great Utah basin, to which they are mostly confined, the general features of these salines being much alike. This valley is, however, marked by this peculiarity. It contains several thousand acres of good farming land and natural meadows, whereas the other marshes are wholly barren. This exceptional fertility is due to a number of small creeks, which, flowing from the mountains, make their way out into the middle of the flat. Aided by artificial irrigation, fair crops of grain and vegetables are raised on this land.

The Columbus Marsh.

This lies 12 miles north of Fish lake, with which it is connected by a narrow valley. While a large portion of this marsh is covered with a thin crust of common salt, it affords but comparatively little borate of soda. At its lower and northerly end, however, when the drainage has brought in and left the various salts leached from the immense watershed around it, a heavy bed of borate of lime has been formed. During the dry season this deposit, through accumulations of the salt coming up from below, suffers marked enlargement, swelling up as if undergoing a process of fermentation. With the advent of wet weather, the moisture dissolving and scattering the salt, the mass suffers a corresponding shrinkage. Under a bed of clay about two feet thick a layer of sulphate of soda occurs, beneath which come in alternate strata of clay and sand, both barren of the borates or other valuable minerals. In 1872 the Pacific Borax Company put up a refinery here, at which a good deal of marketable borax was afterwards made. At a later period the company transferred these works to Fish Lake valley, where they have since been operated for a good portion of the time.

Rhodes' Marsh.

This marsh is located twelve miles northwest from the Columbus marsh, the mineral deposits

of both salt and borax at these two places being much alike. Rhodes' marsh is at all times quite soft, the water coming within a foot or two of the surface, and in wet weather covering the most of it to a depth of a few inches. At the works of the Nevada Salt and Borax Company erected here, about one ton of refined borax is made daily. The method employed in manufacturing the salt is as follows: The crude material as collected from the marsh is placed in large receivers and is there dissolved with steam, after which the mass is run into galvanized iron tanks, inside of which are suspended plates of like metal. Here the borax crystallizes on the surface of the iron, a process which is effected in about six days. When completed, the fluid is drawn off with syphons, after which the crystals are removed and packed for market. With some slight variations, the method of manufacture here in use is the one adopted by the other companies.

Besides borax, the company collect here a good deal of common salt, the best of which is ground for table use, the more impure being disposed of to the silver reduction works in the neighborhood.

Teel's Marsh.

Situated 15 miles south of the town of Columbus, is owned by Messrs. Smith Bros., who have put up on the spot a capacious refinery. The deposits here, which are very extensive, have been largely utilized, the aggregate production of these works exceeding that made by any other in the State.

Other Borax Marshes in Nevada.

Several other marshes exist at other and widely separated points in Nevada. One of these is located near Sand Springs, Churchill county, distant from Columbus over 100 miles. Here a refinery was put up by the American Company in 1870. It contained six tanks, holding 2,000 gallons each, and had a capacity to make one ton of borax daily. These Sand Springs deposits, however, proved to be of such low grade that the company gave up the business after continuing it at a loss for several years. At the Hot Springs, 50 miles farther to the northwest in the same county, occurs another and similar deposit of the borates, and at which a like attempt was made a few years later with like results reached at Sand Springs. In the region of the Mud lakes, in the north-western part of the State, extensive beds of the borates are reported, though nothing definite is known as to their fertility. They will need to be rich to warrant any effort being made at working them, as this will involve the necessity of wagon transportation for nearly 100 miles over an absolute desert.

Besides these marshes, in which this salt occurs in the form of mineralized earths, the waters of certain lakes and springs in different parts of the State have been found to contain a notable percentage of boracic acid. One of these lakes, in the vicinity of Ragtown, Churchill county, was the site of the pioneer enterprise in this branch of production in Nevada. Here, as much as 15 years ago, the manufacture of borax was essayed through the plan of pumping up the water and carrying it out on the adjacent alkali flat, and there leaving it exposed to solar evaporation, which process it was expected would proceed with sufficient rapidity to render the undertaking profitable. But in this there was disappointment, and the scheme, otherwise radically defective, met with early abandonment, the projectors losing much money and producing very little borax.

Russian Mines.

Some idea may be formed of the extent of the possessions attached to the Russian crown when it is stated that the Altai States alone, in which are situated the gold and silver mines of Barni, Panlov, Smijov and Loktjepp, the copper foundry at Sasonn, and the great iron works of Gavrilov, in the Salagirov district, cover an area of over 170,000 square miles, being about three times the size of England and Wales. The receipts from these enormous estates are in a ridiculously pitiful ratio to their extent. In the year 1882 they amounted to 950,000 roubles, or a little more than £45,000; while for 1883 the revenue was estimated at less than half this sum, or about 400,000 roubles. The rents, etc., gave a surplus over expense of administration of about a million and a half of roubles. On the other hand, the working of the mines showed a deficit of over a million; hence the result just indicated. A partial explanation of this very unsatisfactory state of things is to be found in the situation of the mines, which are generally in places quite destitute of wood, while the smelting works are naturally located in districts where wood abounds, sometimes as much as 400 to 500 miles distant from the mines. The cost of transport of raw materials became considerable in this way. By degrees all the wood available in the neighborhood of the smelting works became used up, and it was necessary to fetch wood from distances of over sixty miles. Formerly the mines were really penal settlements, worked by convicts, who were partly helped by immigrants whose sons were exempted from military services on the condition of working in the mines. But since the abolition of serfdom this system has been quite altered, and there is now a great deal of free labor on the ordinary conditions.

Mining Resources of El Dorado County.

It is well known that El Dorado county was, for a number of years, the banner placer diggings county; her product of gold running up into millions upon millions annually. These rich diggings were not confined to any special locality, but extended clear across the county, and the belt, in width, ranged from twenty to forty miles. In those days nothing but surface and river diggings were known, and when the cream had been partially worked off, so that a miner, with the crude facilities then in vogue, could not make over ten or fifteen dollars a day, the claim was abandoned and fresher and more inviting fields sought. Later on these abandoned claims were re-located and worked as long as they would pay from six to ten dollars per day, and then sold or abandoned again. Later on these were again re-located, and with improved methods and appliances, were made to yield handsomely; and so it has gone on up to the present day, until there is now very little surface ground left that can be profitably worked. But we have yet unlimited deep gravel deposits that are rich in gold, as well as untold rich quartz veins, which have already been made to give up many millions in treasure. These require capital to develop, in most instances, though occasionally mines have been made to pay right from the grass roots down, the pay increasing with depth. Enough money has been squandered in the attempted development of some of these mines, through incompetence, mismanagement and dishonesty, to have opened and thoroughly developed a hundred or more good paying quartz and gravel mines, had the money been properly applied. As it is, we have to-day but comparatively few good paying mines, and they are in the hands of private individuals or close corporations, and little is said or known about them, beyond the knowledge that they are good paying properties.

We have a number of partially developed quartz mines that, for the work done, promise well. Some are tied up because of quarrels among owners, some for want of means to proceed further with development, and others are held for a sale at large figures, while the development is not sufficient, as a rule, to warrant paying prices demanded.

If capitalists would, instead of paying high prices for shafts and tunnels with indifferent prospects, purchase a few undeveloped, or partially prospected mines, or hold them, have them economically and intelligently tested by practical miners, instead of sending some impractical squirt, with Col. or General prefixed to his name, from New York or Boston, to superintend them, and fool away the money intended for legitimate work, they would be sure to get an occasional good mine at much less expense than has been their usual experience.

Grizzly Flat, some twenty miles east of Placerville, is to-day a more promising field for the judicious investment of capital in legitimate mining than can be found in the same extent of territory anywhere else in the State, and but two or three years at least can elapse, even with present progress, before capitalists will be astonished that they did not sooner recognize the wealth of that locality, and secure a goodly share when it could be had at nominal figures. Of course every prospect hole does not constitute a mine, but good mines are discovered by first sinking prospect holes, and developing only those that prospect well; but, unfortunately, too much money has heretofore been lavished upon insignificant prospects all over the county—in some instances with a view to catching gudgeons, and realizing handsomely, which, in a number of instances, has proved a success, but to the detriment of our best mining interests, as it has given quartz mining, to a great extent, a black eye with those who do not fully understand the situation. But this matter is becoming better understood, and we are confident that it will not be long before a tide will set in that will fully demonstrate the fact that we have as good quartz mines, and more of them, as are to be found anywhere in the world.

In the immediate vicinity of Placerville, at no distant day, a dozen good quartz and gravel mines will be developed and operated, which, together with the deep gravel belt in its entire extent, will give employment to at least a thousand miners. The north side of the county is also as fair a field for the development of good mines as is to be met with anywhere on the coast, but considerable capital, hard work and good judgment is required to open them up, and this is necessary in any enterprise of similar magnitude. South of Placerville, also, there are some excellent mines, and numerous flattering prospects for many more. This interest is as yet really in its infancy, but can remain so but a short time now, as the fact is becoming so generally known that what we have claimed for years is a veritable fact, that our mineral belt is teeming with hidden treasure. The enormous quantities already secured, the good and permanent mines now developed and working in all directions, and the large extent of country open to prospect and development, all clearly point in this direction.—*Placerville Observer.*

THE mineral belt in Sweetwater district extends from seven to eight miles north and south, and is about two miles wide. It is in porphyry, mixed with felspar overlying syenite on the west. It is a somewhat curious fact that all the lodes on the east dip to the west, while those on the west dip to the east.

ENGINEERING NOTES.

Great Bridges.

The new bridge across the Firth of Forth, now building, will, when completed, be among the most remarkable bridges in the world. The main girder will be within a few feet of a mile in length, and will rest upon round cylindrical piers, each of which will weigh 16,000 tons. It will, of course, be high enough for all vessels to pass underneath, and about 42,000 tons of steel will be required in its construction. The estimated cost will be \$7,500,000.

China possesses the longest bridge in the world. It is at Lungang, over an arm of the China sea, and is five miles long, 70 feet high, with a roadway 70 feet wide, and has 300 arches. The parapet is a balustrade, and each of the pillars, which are 75 feet apart, supports a pedestal on which is placed a lion, 21 feet long, made of one block of marble.

The highest bridge in the world is said to be the railway viaduct at Garabie, in France, now being erected over a river in the Department of Cantal. The bridge has a total length of about 1,800 feet, and near the middle of the great center arch, which is one of the noteworthy features of the structure, the height from the bed of the river to the rail is 413 feet.

The Erie railway bridge at Kinzua, near Bradford, Pa., is also an astonishing. The greatest elevation of the bridge (301 feet) is 18 feet higher than the spire of the Trinity Church. 24 feet higher than the summit of the Brooklyn bridge towers above high water, 143 feet higher than their elevation above the roadway, and 82 feet higher than Bunker Hill monument. The bridge is 2,052 feet long.

The Brooklyn bridge is 5,989 feet long; clear height in center of river span, 135 feet; length of river span, the longest span in the world, 1,595 feet. *Ex.*

SANITARY ENGINEERING. The Massachusetts Institute of Technology has under consideration a proposition to establish a course, especially for the training of men to combine something of the architect, the civil engineer, the chemist and health officer. The problems of house drainage, water supply, sewerage for cities and towns, dwelling and factory construction, and general sanitary regulations are to be given special attention in connection with the usual course in civil engineering. It is not probable that any great number could find speedy employment or business in this specialty, but the fact that a leading technical school is seriously contemplating the introduction of sanitary engineering as a feature of its curriculum indicates that there is a pretty strong pressure, if not a positive demand, for men educated in this direction.

ANOTHER BIG BRIDGE.—It is reported from Russia that the question is being agitated of connecting Cronstadt and Oranienbaum by a bridge, at a cost of about \$12,000,000. The structure will be erected under the supervision of engineers appointed by the Russian Government. It will rest upon granite pillars, fixed by the caisson method, each of them protected from the action of the waves during the prevalence of southwest winds by an angular wall-like guard of stone. The bridge will be about five miles in length, and it is expected to be completed in the year 1889. When finished it will consist of two parts—a railway and a foot-bridge and will be illuminated by the electric light.

A DOUBLE CABLE ROAD.—They are about to introduce the San Francisco system of cable roads into Kansas City, but with this difference: This will be the first railway of the kind that will be provided with an extra cable, the second cable to be used only in case of breakage or other disability of the first cable. The delays and annoyances from the breakage of cables, especially in new roads, where green hands have to be broken in, are very vexatious, and should be provided against if practicable at a reasonable cost.

CAPTAIN EADS is now busily engaged in London with a corps of draftsmen and engineers preparing a complete set of new models to illustrate his proposed ship railway across the Isthmus of Tehuantepec. It is understood that a number of prominent English engineers have manifested considerable interest in the project, and that in the course of a few months some negotiations will be entered into which are expected to give the enterprise a definite shape.

THE COMMERCE of the seas is carried on by about 12,000 steamers and more than 100,000 sailing vessels, while the railroad traffic of the world employs about 66,000 locomotive engines and 120,000 passenger and 500,000 freight cars. There are 200,000 miles of track, and the capital invested is \$20,000,000,000.

AN elevated passenger railroad, extending some 10 miles from the Delaware to the western limits of Philadelphia, and costing \$8,000,000, is projected, and said to stand a fair chance of being built. Its principal route would be through a narrow thoroughfare called Cherry street.

CAPE COD CANAL.—Work on the Cape Cod Canal is progressing, with an energy which shows that the present projectors are in earnest, and intend to complete the work at an early day.

USEFUL INFORMATION.

Birch Oil.

Birch oil is a new product which is coming into notice. A contemporary gives the following as a simple and cheap process for its manufacture: "The apparatus consists of a furnace, a boiler, a tin pipe, a trough into which water is continuously brought from a mountain brook, a barrel and a glass jar. The furnace is made of loose stones, so arranged that the fuel is put in at one end and the smoke goes out at the other through an old piece of stovepipe. Over the furnace is the boiler, which is merely a wooden box about three feet wide, four long and three deep, with the bottom covered with sheet iron to prevent burning. The boiler has a wooden lid, so that it can be tightly closed, and from the top leads the tin pipe. This pipe runs into the water trough and through it, so that the water always surrounds and cools it. The end of the pipe, after coming out of the trough, opens over a barrel, and in this barrel, exactly under the end of the pipe, is placed the glass jar. This constitutes all the plant."

The boiler is filled about a third deep with water; the birch bark and twigs are shoveled in until it is full; the lid is placed, and the fire started in the furnace. For hours the fire must be carefully watched, and fresh fuel continually furnished. The material in the boiler becomes heated, the oil in the twigs extracted and mixed with the water. At boiling heat, the steam arising from the water and oil passes through the tin pipe and becomes chilled by the water in the trough; a condensed liquid is the result; and this mixture of oil and water escapes from the pipe, when it naturally separates. It drips into a glass jar placed over a barrel; the heavy oil sinks to the bottom of the jar, while the water flows over and is saved in the barrel, to be again reboiled the next day. The oily substance saved in the jar is the oil "pure and undefiled."

STREET DANGERS INCREASING. The dangers of the streets increase with advancing civilization. A New York Juvenal would have many perils to notice in addition to those which he has described as threatening the pedestrian in the streets of Rome. The employment of the electric light in the city just mentioned has already produced several serious accidents. The latest recorded was by the breaking of a telephone wire, which fell upon an arc light wire, deflecting from it a portion of the day current. A team of horses drawing a coal cart arrived just in time for the fallen wire to drop on them. The horse on which it first rested stopped instantly, trembled violently and then dropped to the ground, kicking convulsively. As he fell the wire came in contact with the second horse, and with exactly the same results. The driver sprang from his seat in the cart and recognizing the wire as the cause of the accident, he took hold of it to pull it off the horses. Those who saw the incident say he did not hold it the millionth part of a second, when he dropped it with a terrific yell, and he remained speechless and unconscious for some time. Fortunately no life was lost; but if the accident had occurred at night, while the full current was passing through the wire, the man and the horses would doubtless have been killed. —*St. James Gazette.*

DIGGING WELLS.—The old way of digging a well and stoning it up so as to leave it about three feet in diameter, is a very good one where the well is to be left open and the water drawn up with a bucket; but a very poor one if it is to be covered and the water raised with a pump. If covered, a large space is left for dead air, which often affects the character of the water, and makes it unsafe to enter the well. When thus stoned up and a pump used, the covering should be at or near the water. But if a pump is to be used the better way is to save the cost of stoning—dig the well in a dry time, and put in a cement pipe, after a sufficient quantity of water has been reached, and continue the pipe to the surface, filling up the well outside the pipe. The pipe should be covered, but the quantity of air confined will be small, and as the well cannot be entered no danger will arise from that source.

TO BRONZE IRON OR STEEL.—A German technical journal gives the following method of producing a bronze-like surface on iron or steel, which prevents rust: The object to be acted upon must be cleaned so as to take off all oxidation or other impurity. It is then exposed for two or three minutes to the action of the vapors of a heated mixture of hydrochloric acid and nitric acid in equal portions, at a temperature ranging from 550 to 650 degrees Fahr. After the objects have cooled, they are to be rubbed over with vaseline, and again heated until the vaseline begins to decompose. This treatment with the vaseline has to be repeated once. Should a lighter coloring than bronze be desired, it can be produced by mixing acetic acid with the other acids.

WHAT THE ZERO MARK MEANS.—Ninety-nine citizens out of a hundred had something to say about "zero" yesterday; perhaps not one in a hundred could have told off hand why a point thirty-two degrees below the freezing point on Fahrenheit's thermometer is called zero. For that matter, nobody knows. The Fahrenheit

scale was introduced in 1720. Like other thermometric scales, it has two fixed points the freezing point, or rather the melting point of ice, and the boiling point of water. The Centigrade and Reaumur scales call the freezing point zero, and measure therefrom in both directions. This is a very natural arrangement. Fahrenheit kept the principle on which he graduated his thermometers a secret, and no one has ever discovered it. It is supposed, however, that he considered his zero—thirty-two degrees below freezing—the point of absolute cold or absence of all heat, either because being about the temperature of melting salt and snow, it was the greatest degree of cold that he could produce artificially, or because it was the lowest natural temperature of which he could find any record. The grounds on which Fahrenheit put 180 degrees between the freezing and boiling points are likewise unknown.

COTTON BELTING.—An advocate of cotton belts says: "Woven belts give and take. This is in the nature of a woven material. When first put on, they require 'taking up' once or twice more than leather. The stretch is approximately six per cent as against four per cent in leather; but once well at work, they give less trouble as there is but one joint to take after. If put on really tight enough, this stretching is diminished to a great extent. Users are afraid to overstrain the belt, but the extraordinary result attained by certain experiments made as to tensile strain, shows the impossibility of breaking a belt under fair conditions."

GEYSERS AND SPRINGS IN THE YELLOWSTONE PARK.—The latest scientific explorations of the Yellowstone Park, made during the past summer by members of the United States Geological Survey, show that it contains 500 geysers and 5,000 hot springs. These numbers are somewhat larger than those obtained in earlier surveys.

DEEP DRIVE WELLS.—At Norwich, England, a drive well has been put down to a depth of 157 feet, and might have been driven deeper if required. The tube was two inches internal diameter. At Montreal, Canada, a drive well tube has been driven 174 feet.

COLORS IN THE ELECTRIC LIGHT.—The employment of the electric light is impracticable for many purposes, because it fades colors as effectually as sunlight.

GOOD HEALTH.

Elevated Railways Cause Eye Troubles.

The introduction of the elevated railway into the streets of New York, says the *Scientific American*, has also brought in a peculiar class of optical troubles, due to the lodgment of iron dust in the eyes of pedestrians and others who have occasion to travel or pass under the railway structures. Hundreds of such cases are now treated at the hospitals, and most of them are successfully cured, the particles being removed by a gouge-shaped instrument about the size of a sewing needle. The pieces are too firmly held to be removed by magnets.

The trains have a high speed between stations, and are quickly brought to a stop. This requires strong braking, which grinds off the iron from the shoes in fine showers, and the iron particles fly in all directions.

A magnet applied to the tops of the cross ties attracted a large quantity of very fine iron dust. Each passing train deposits its quota of iron, not only on the cross ties, but upon the street below. * * * These particles varied in size from one-sixteenth of an inch to dust so fine as hardly to be distinguished by the naked eye, and were frequently entirely invisible, requiring the aid of the microscope to reveal them. Viewed under the microscope, their dangerous character becomes apparent. The greater part were bordered by a jagged fringe with very fine points, compared with which the point of a cambric needle appeared dull. Not infrequently the projections were hook-shaped and barbed similar to a fish hook, which will account for the difficulty experienced in removing them from the eye, into which they have been driven—the closing of the eyelid and the rubbing which thoughtlessly followed, assisting to more firmly imbed them in the cornea.

In order to determine whether iron particles could be attracted while floating in the air, a magnet exposing about one square foot of surface was suspended in mid air under one of the railroad tracks, and although the magnet was by no means a strong one, it attracted to itself iron particles in spite of a strong wind which blew at the time.

Further, the awnings of shop keepers along the lines of the elevated railroad are discolored by iron rust in a very short time, and require frequent renewals, since washing fails to remove the stains which the rust produces.

The evil above described being manifest, the question of its prevention naturally suggests itself. The subject is worthy the attention of inventors.

OILY SKIN.—In some persons there is an excessive production of sebaceous matter or sebum, due to morbid activity of the fatty glands of the skin. The skin of such persons presents a shiny look. Little beads of oily matter may be seen at the mouth of the glands near the roots

of the hairs. The forehead, nose and cheeks are most frequently affected. When the scalp is affected, the condition may be indicated by soiling of the pillow. Acne is frequently accompanied by this condition. Treatment.—The only treatment to be employed is the frequent application of soap. When many of the glands are clogged up, as indicated by the abundance of grubs, the surface should first be thoroughly rubbed with warm oil. Coconut or almond oil is the best. After half an hour the surface should be rubbed with a flannel cloth, thoroughly saturated with soap moistened with warm water, and stretched over the fingers, or a soft sponge may be used. This is best done at night, just before retiring. When the secretion of fat is very profuse, the operation may be repeated two or three times a day. —*Good Health.*

AN ENGLISH COUGH REMEDY. One of our English contemporaries, in reply to an inquirer, recommends a syrup made of the following ingredients for colds and coughs: Take 18 ounces of perfectly sound onions, and after removing rind make several incisions, but not too deep. Boil together with 13½ ounces of moist sugar and 2½ ounces of honey in 35 ounces of water, for three-quarters of an hour; strain, and fill into bottles for use. Give one tablespoonful of this mixture (slightly warmed) immediately on attack, and then, according to requirement, five to eight half-tablespoonfuls daily. It is said that this recipe was that used by the Zulu Caffres when visiting Europe some two years since, and who suffered much from the climate, but invariably recovered upon its use.

FOOD AND NUTRITION.—So long as men exist there will doubtless be one, occasionally, says the *Mechanical Engineer*, who will obligingly figure out for us the amount of nutriment contained in certain kinds of food. This is a harmless amusement, and as useless as harmless. What does it matter how much nutriment is contained in this or that edible? Very little, for it is that which one's system is able to assimilate, or take up, which strengthens, not the quality which passes into or through it. Savors assist deglutition quite as much as more nutritious food. There is no danger that mankind will not get enough nourishment; the trouble is in the opposite direction usually.

A REMARKABLE CASE OF TRANCE.—A case of trance has lately ended in Glasgow. A woman thirty-five years of age has lain since June last in a state of coma, motionless, with closed eyes, a pulse of about eighty per minute, natural temperature, and normal breathing. Consciousness was entirely absent until, at the end of November, she suddenly awoke, and is now recovering her wonted strength. During her long sleep she was fed daily by a stomach tube. The case is well-nigh unique on account of its duration. These trances are the puzzle of the physiologists, and simulate death so closely that patients have been in danger of burial alive.

SHERRY AND CIDER.—Liebig, an authority in matters of health and things which are good to eat and drink, thus wrote: "Sherry and strong cider are more quickly intoxicating than the generality of wines, and they have a peculiar influence on the gastric juices of the stomach. The intoxication of beer is heavy and dull, but its use does not bind the drinker from gaining flesh. The drinkers of whiskey and brandy are going to certain death. Red wine is the least hurtful, and in some cases really beneficial."

BIRDS AND EPIDEMICS.—There is a good deal of testimony to prove that birds and insects disappear from localities about to be affected with epidemic disease. More attention should be paid by medical men to the collection of meteorological information and collateral data during the prevalence of epidemics. It is nearly a virgin field for scientists.

HUMAN SKIN and the skin of young rabbits have been successfully applied in small pieces to large healing surfaces in wounds. Dr. Wilson, however, according to the *Medical News*, claims to have obtained very much better results from the use of the internal membrane of hen's eggs. The eggs should be fresh and warm—warm from natural heat.

HOT MILK AS A RESTORATIVE.—A writer in the *Medical Times and Gazette* recommends the use of hot milk as a restorative. Milk, when heated above 100 degrees F., loses its sweetness and density, but has a most beneficial influence over mind and body when exhausted by labor or mental strain. Its effects are more invigorating and enduring than those of alcoholic stimulants.

HOT LEMONADE FOR DIARRHŒA.—Some people prefer hot lemonade to the usual form, but it is only recently that we have seen it recommended in diarrhœa. Dr. Vigouroux recommends a glass of hot lemonade every hour, or half hour, as an easy, agreeable and efficient treatment for diarrhœa.

Hot milk is an excellent food for consumptives. From four to eight glasses should be taken daily. The evidences of benefit are increase in weight and strength, lessened cough, and checking of bowel looseness.

CHARCOAL POUULTICE.—Sprinkle fresh, finely powdered charcoal over a bread and milk poultice in a thin layer, and apply as usual.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

SUTTER CREEK.—Cor. Amador Ledger, May 24: Work is still going on at the Lincoln mine. There are three or four men on contract, and hopes are entertained of striking something before long. The Con. Amador mine, according to current reports, is on the improve. An improvement in the quality of rock has been noticeable in the last week or two. The Company is paying off this week. W. A. Woodworth has started an eight-mule team to haul a few timbers for the Mahoney mine. He is under engagement for the summer to haul timbers for the Keystone mine. Strickland, McKean and Hughes, who have been running on hydraulic claim about six miles above here closed operations last week on account of the shortness of water. The cleanup was up to all expectations, and there is ground enough to keep them going for years to come. During the summer they will devote their attention to burning coal, etc.

NOTES.—Amador Ledger, May 24: The gravel claim of the McKee Brothers, at American Flat, Oleta, was cleaned up a short time ago. The season's run was about three months, and we are told the amount taken out was \$1,200—considered a satisfactory result. S. H. Loree is engaged in cleaning up his hydraulic claim at upper Rancheria. The gravel claim of Hadley & Vair at Upper Rancheria is running full blast, with flattering prospects. At the S. Julien quartz mine, Middle Bar, connection has been made with the surface at the end of the tunnel by upraising until an old abandoned tunnel has been tapped. The ventilation has been much improved thereby. On Tuesday a new body of rich quartz was struck, said to be over two ft. wide. The mill had been running on slate for a week previous, but was started on the new ore-body last Wednesday. The new concentrator just rigged up for test purposes by Judge Reed, of Jackson, is in full operation and works charmingly. It bids fair to prove a very valuable invention, and we shall give a full description of it at an early date. The Mahoney pump broke Tuesday, after getting the water down to within 20 ft. of the bottom. The break will necessitate a period of idleness for three or four days during which the water will rise considerably. It is probable, however, that next week will see the bottom of the shaft. The big tunnel at Middle Bar is in over 9,000 ft. The present contract for 1,000 ft. is expected to be completed within two weeks. A blower is on the ground, and will be in running order in a few days. R. B. Reed and W. B. Vandemant, owners of the St. Louis mine, near Clinton, are crushing rock by arrastra process. They have a tunnel run about 100 ft into the hill, and have struck the ledge at 100 ft from the surface. The ledge is from three to four ft wide, and has paid an average of \$60 per ton. They can only crush about half a ton per day, and are not prepared to work on a larger scale until they get it more fully opened up. The Matson mill near Butte was started this week on rock from W. E. Stewart's claim near Big Bar.

El Dorado.

REVENGE.—Georgetown Gazette: We learn that work preparatory to starting up the Revenge mine near Greenwood is being pushed forward with much energy, under Superintendent Dixon. A force of mechanics consisting of D. W. C. Benjamin, Milo Knox and Fred Smeder have just completed the boarding house, and now begin the work of putting up a fine five-stamp mill.

Mariposa.

HORNITOS.—Mariposa Herald: The No. 9 mill has been running the past week. Mr. Huling is on his way here from the East, and as soon as he arrives work will be resumed on his numerous mines, which have been flooded during the winter.

Mono.

LUNDY.—Homer Mining Index, May 24: The Bryant mine was practically the first on which operations were begun this season, and as it has in sight a large quantity of high grade ore, negotiations are now pending for a mill. Forty-nine tons of ore taken from the 130 level of this mine last Autumn, and hurriedly worked in the primitive two-stamp mill in Lake canyon, yielded \$2,937, or within a fraction of \$50 per ton. The 201 feet of drifting along the vein on the 130 level shows a uniform thickness of two ft of ore of the same quality, the fissure itself being much wider, but materially filled, at that level, with other vein matter. James McDonald, one of the owners, is at present in charge of the work, and Hon. P. Reddy, who is also a large owner in this valuable property, is expected here at an early day to consult as to the best plan of opening and working the mine on a comprehensive scale. The greatest activity prevails about the May Lundy property—mine, mill, tramway and wagon road. The mill is being thoroughly overhauled and put in readiness for the additional five stamps, which are expected here every day, and which will be planted as an eastern extension of the other batteries. Large numbers of men are strung along the whole length of the road from the mill to the foot of the tramway, and the road would have been cleared for the passage of teams by Monday next but for the interference of rain storms during the week. The mine has been cleared for action, and the working force underground is still being steadily increased. The winter's damage to the tramway is also being repaired, and it is expected that the ore teams will be put on the road about the 2d proximo. Reports reach us that very favorable indications are being met with in the Great Sierra Tunnel in Tioga district. The country rock is now said to be unusually soft, full of stringers of quartz and saturated with water. Nothing has been heard lately about the resumption of work on the Detroit copper mines in Jordan district. A snow slide carried away 250 to 260 ft of the tramway during the winter. The Gorilla mine has been put in excellent condition for the extraction of ore, and manager Winterhalter is expected here the coming week to start up work on a larger scale. Supt. D. E. Jones was expected at Jonesburrow yesterday, and will doubtless start up the Virginia creek hydraulic next week. Over at Mount Raymond the snow is said to be still 25 ft deep, and it will be late

in the season before any work can be done at the mines.

Nevada.

THE NORWAY MINE.—Nevada Transcript, May 24: Dr. Buelow returned this week from a trip to the Norway mine on Canyon creek seven miles above the town of Washington. Seven men are at work there, and he found the developments to be most encouraging. The ledge is two and a half ft thick in the lower tunnel (which gives 2,000 ft of backs), and the samples of ore the doctor brought down with him are very rich in free gold. Quartz is being taken out regularly, and the mill will be started in a week or ten days.

BROKE A PUMP ROD.—Grass Valley Union, May 23: The rod of the 8-inch pump in use in the Peabody mine broke during Friday night, and brought operations to a standstill at once, as the water rapidly rose and drove the miners out of the drift. This is an annoying accident to the company, as they had just commenced taking out ore of an excellent quality. This break-down will cause the shaft to fill with water, and another pump will have to be put in to drain the mine as the other pump in the meantime will be submerged.

MINING NOTES.—Grass Valley Union, May 25: The work of driving the tunnel in the Pittsburgh to a connection with the main working incline is progressing favorably, and it is expected that it will be completed in about one month, when the mine will soon be drained of water and regular mining operations started up. The shaft of the Grass Valley Company's mine (the Bobby Smith ground) on New York Hill, is now down 80 feet, and the work is being prosecuted regularly. The mine is well located and has heretofore prospected well, and there is every indication that it will prove an excellent mine.

Sierra.

GOLD KING QUARTZ MINE.—Sierra Tribune, May 24: Two men have been engaged in running ahead the new working adit at the Gold King Quartz mine, near Alleghany, this winter. There are yet 400 ft of tunnel to run before tapping the ledge. As the rock is very hard it is barely possible that the work can be accomplished before another season. It was reported that a Burleigh drill would be put in at the mine, but this is only a rumor and it is questionable whether it will be done or not. With the short distance of tunnel to be run it can probably be carried through in the ordinary way at a less expense and will require but little more time. Mr. Weldon, who has passed the winter at his home in Oakland, will arrive at the mine about June 1st. Before that date he will ship several months' supplies from below. Mr. Weldon is a live and energetic gentleman, and we are glad that he has been fortunate enough to find a lead that will warrant his remaining with us.

IN TOWN.—Supt. Lawrence, of the Brandy City mine, was in town this week and dropped in for a few moments' chat with us. He was down below not long ago and told those slickens fellows some pretty plain truths. However, they were unyielding so far as allowing his company to continue work at the mine is concerned, and so operations have been suspended there. The closing down of this claim is a severe blow to Brandy City, the effects of which we discuss more at length in another column.

PUSHING WORK.—B. F. Littlejohn, W. H. Graham and Mr. Lynch were down from the San Salvador gravel claim last week. This mine is located at the head of Nebraska, and a tunnel has already been run into the hill 145 ft. Y. C. Lawson, another one of the stockholders, is expected up from San Francisco this summer. The latter gentleman is in the employ of Wells, Fargo Express Co. at the bay. We are pleased to learn that he has recently been promoted.

BALD MOUNTAIN.—Mountain Messenger, May 24: The Bald Mt. Co., have raised ten and a half ft from the tunnel run from Lowell Avenue into the South Fork, and found fine looking gravel. There has been no clean up as yet, but two pieces of gold, worth \$3 each, were discovered in the riffles of the prospecting dump, Tuesday. The Bald Mt. Co., are steadily working back with their pillars, where the gravel pays well. About fifty men are employed. The main tunnel of the Bald Mt. Extension Co., is now in over a mile—3,500 feet in an air-line to the bend up the ridge. Breasting in No. 6 down stream, lately stopped by water and a cave, was resumed Monday.

ALLEGHANY.—All the drifting and placer claims hereabouts are yielding good returns, with a fair prospect of doing better in time. Ten men are employed in the digging at Smith's Flat, reported as yielding profitably. Last month 184 ft was made running the main tunnel of the Rainbow. Work was stopped for necessary repairs two and a half days last week. The new bridge across the creek is completed. Two Ingersoll drills, worked by compressed air, are managed by four men at the face of the main tunnel; and forty pounds of Giant powder used in a blast, two being put in each twenty-four hours; arrangements will soon be made for three. Main tunnel now in slate—air-line from mouth, 1,100 feet. About 1,300 more to run to reach the ledge. The ore when abandoned on account of water in the pay chimney above assayed \$100 per ton. Fully \$250,000 have been thus far expended in the development of this valuable property, and \$350,000 worth of rich quartz extracted. The new main tunnel will cost about \$60,000. The blacksmith shop at the mouth of the tunnel has been tumbled over by the force of the underground explosions. A large amount of supplies are now on the way to the mine from the lower country. Wm. Hanley, Jr. is Supt., and ably performs the important duties entrusted to him, and most courteously entertains visitors. J. O. Briggs, cousin of your President of the Bald Mt. Extension Co., is blacksmith. The prospect is good for the completion of the tunnel to the ledge so as to start the mill by next winter. The estimated value of the rich quartz chimney beyond is figured at least to be one million dollars.

C. S. Benham is in Sonora, New Mexico. It is reported that he will be here soon, and the Golden Gate quartz mine re-opened this summer, by running a tunnel 1,400 ft in from Wet Ravine to reach the ledge 600 ft below the old works, when it is believed that the mine can be made to pay. Nothing is being done at the Kenton ledge. The Spoon quartz mine is located midway between the Rainbow and Kenton on the south bank of Kanaka creek. The upper tunnel, now in 200 ft, is being run for the ledge. Two lower tunnels are in for the same distance,

The second will be extended with the third or highest, and then the two will be connected by a shaft for air. The property is owned by J. T. Bradbury, of Alleghany, who, with his sons and one hired man, is developing the mine. Ore prospects well with a hand mortar. A cannon-ball mill could be profitably used. The mine is reached by a trail from Alleghany. J. Booth and Wm. Wright have their tunnel, one mile and a half northeast of Alleghany, in 200 ft with fair prospect of soon reaching good pay. Several rich specimens have been found. The gold is of the same quality as that of the Bald Mt. Extension, and evidently from an outbreak of the main channel beyond the lava flow. The Mammoth Springs Co. are extending an old tunnel, run in early times, to find an extension of the rich lead that paid so well years ago. The Buckeye drift claim, one-quarter of a mile below Alleghany, Smith's Flat, is owned by B. Hockleberg, J. L. Patton, F. Barnhardt and A. Burgan. The main tunnel is in 1,700 ft. The gravel is soft and of a blue color. One breast is being worked by five white men—Thomas Murta, Jack Young, Dick Bennett, John Smith, J. L. McCormick. Two Celestials run the buggies from the breast to the chute. The pay is very good. This is reckoned as valuable mining property.

San Bernardino.

CALICO DISTRICT.—Calico Print, May 24: At no time since the first discovery of silver in our hills has the camp appeared as lively as at the present time. All the principal mines are looking well and working their full complement of men, while the chloriding element is doing a wonderful work in the development of property that a year ago was considered comparatively worthless. By slow degrees our prospectors are beginning to realize that no particular seam, reef, or variety of porphyry, carries ore to the exclusion of the others; but that every square yard of ground within the mineral belt must be inspected before an intelligent conclusion can be found as to the probability of its containing ore. This, together with the fact that some of the most promising ground in the camp has recently been thrown to individual enterprise, has given chloriding an impetus it never before has known. Scores of men are now at work on leased ground in various parts of the camp, and the majority are doing well.

SAM HOUSTON NO. 3.—Mr. R. B. Johnson, who so successfully operated this mine a year since, and then sold the property, has obtained a lease on the Sam Houston No. 3, Blackfoot and Santa Maria mines, and arrived on the 5th to commence operations. He struck a large body of ore immediately, and informs us that he could already furnish 100 tons as rapidly as it can conveniently be disposed of. Three men are now at work and more will be added as the work progresses. The ore is not as rich as the mine has produced, but we are assured that a \$100 grade can easily be made, and plenty of it.

BISMARCK.—This mine is still looking well and now that the tunnel from the south slope of the hill to the old works is completed, operations will be greatly facilitated. The position of the ore in the mine renders it necessary to remove a great quantity of waste rock, the disposition of which had somewhat perplexed the managers until the new outlet was decided upon.

PINTO.—Mr. Henry Myres, after almost a year spent in prospecting this mine, has been rewarded at last by striking a large body of high grade ore near the south line. In general character the ore is peculiar to the ore in the immediate vicinity, consisting of red chloride of silver, of the softest variety of porphyry. About 15 tons have been taken out and a great deal more is still in sight.

OCCIDENTAL.—The Occidentals Nos. 1 and 2, which were recently purchased by Mr. Wm. Raymond from the Oriental Company, are being worked by chlorides with good results, as are also the Thunder, St. George and others.

INVINCIBLE.—Work is still progressing on this mine. Mr. Thos. Allen has for the past six months been working the mine in behalf of the owners and has never failed to make it pay.

HUMBUG.—No ore is now being taken out, but three men are busily employed assorting the huge ore dumps—putting the first class in sacks, piling up the second and removing the waste.

KING MINE.—The work on the King mine is being driven steadily forward. The mine never looked better than it does at present. The ledge holds its own as to quality and quantity of ore.

LITTLE V.—In January last Mr. E. Woolman purchased a one-third interest in this mine, formerly owned by J. H. Kane. Pleased with his investment he soon afterwards bought another one-third interest of Wm. Raymond. Since first coming into the mine Mr. Woolman has been steadily employed in taking out ore, seven tons of which, averaging \$150 per ton, have been milled, and over eight tons now on the dump, are expected to yield \$200 per ton.

COMET.—Four men are now at work on this mine. A tunnel is being driven to crosscut the main ledge and two men are engaged in taking out ore.

SNOW BIRD.—Seven men are now employed in taking out ore on this mine. Seventy-five tons are waiting to be crushed at Mr. Sinclair's mill, which commenced its first regular run on Monday last.

A NEW DISTRICT FORMED.—Messrs. Kincaid, Eckles and Gray, returned on Friday of last week from the De Soto mine in the newly formed district of the same name. The new district embraces the west half of the old Lava Beds district. They report everything as encouraging, both there and at the Lava Beds. Thirteen men are employed on the Meteor mine, two on the Morning Star and several on various other claims in the latter district. Having accomplished the work they proposed to do on the De Soto, which was to procure a working test of the ore, they gave a contract for a 50 foot tunnel to be driven on the main ledge near the northwest end of the mine, and returned to look after their interests in Calico, and spend the hot season in more comfortable quarters. The work of development will probably continue throughout the summer.

Mr. Remi Olivier, who is interested in the De Soto mine, says his property is in first-class shape. They are now assorting their ore previous to sampling and as soon as returns are made will make figures public. Mr. George Dessalier, foreman of the Cuba, reports work on the Landers and Stewart McVey struck it on Tuesday. They have been working a claim across Wall street, and had done the assessment work on the same. While walking

around at some distance from their work they came on to croppings of a ledge from 15 to 20 ft in width. They took a few pieces to an assayer and got the following in silver: \$26, \$34 and \$64 per ton. Wm. Hale & Co., who have leased ground from Mr. Wm. Raymond, on the Garfield property, are doing well. The first day's work on the lease brought out 15 sacks of \$500 ore. The Thunder, located in East Calico, has taken out in three days' work nine sacks of ore, which was assorted and ran on an average \$2,000 per ton. The prospects are better than ever. J. W. Hudson, of Los Angeles, the owner of the New York mine, lately arrived in Calico to look after the development of his property. He has a few men at work engaged in cross-cutting from the shaft. Mr. Wm. Raymond is starting a tunnel to tap the mountain as low as possible. It will be 150 ft to the south of and 115 ft below the level of the present tunnel on the Garfield. The Kearsage is now down 80 ft in good ore, some of which is looking better. Mr. Stevens is drifting on both upper and lower levels. The St. George mine in East Calico, run by Whitfield, Hale & Co. on a six months' lease is doing well.

Shasta.

LOWER SPRINGS.—Shasta Courier, May 24: Jones & Son, of Lower springs are industriously at work putting up the works for their new quartz mill. The machinery will be run by steam power, and as the elder Jones is an engineer, he can attend to that part of the business. The mill separator, etc., will be put in running trim by a machinist from the San Francisco factory. There is now on the dump of the mine twenty tons of ore which assays well, and on White's claim near by there is a large amount of ore out ready for crushing. The prospects are now favorable for the development of the great quartz interests of the Lower Springs district. The mines there are undoubtedly rich and permanent, but have long suffered from the effects of getting a "black eye," from former attempts at working them by inexperienced miners and millmen.

MAD OX.—Cor. Shasta Democrat, May 24: The Mad Ox mine has proved itself to be one of the finest in Northern California. After running a tunnel of over 700 ft in length, they revealed a beautiful vein of good-paying ore over 600 ft from the surface. The Mad Ox mill is in constant motion, crushing from sixteen to eighteen tons per day. J. S. Strode has erected a cannon-ball mill on his mine. It works like a charm. It is reported that the Banghart mine will be worked next month. Jno. Daugherty is working a seam mine on Knobloch. He reports prospects very favorable. R. M. Manigal is seeking the hidden treasure in the Mad Mule mine. Owing to the insolvent condition of the Phoenix Company, their mill and mine still remains in the "pit." R. Warfield & Co. are working their claim on Mad Mule mountain.

Siakiyou.

ON THE KLAMATH.—Yreka Journal, May 24: Messrs. Brown, Bailey & Bowles, of the Grizzly Gulch quartz mine, Indian creek, crushed eighteen tons of quartz lately, which yielded about \$800, and now they intend sinking down on the ledge. Work is progressing steadily in the Empire quartz mine at Klamath river, in running the lower level, where the rock is very hard. Pieces of quartz are found, indicating probability of soon reaching the main ledge, towards effecting drainage of the shaft sunk down from the upper level on the ledge, where it was impossible to work on account of too much water. The Highland Chief quartz claim, owned by Messrs. Jacobs, Renner & Co., on Klamath river, below Capt. Pope's ranch, is now being gradually prospected, and it is the intention to soon put up an arrastra which can be run by a wheel set in the river. The Fort Jones Company at Klamath river expect to have their wing-dam completed in about a week or ten days, and will then start their pump and hoist gravel also from the top bench. We learn from Dick Smith, Captain of the Lime Gulch claim, Klamath river, that work is progressing gradually in preparing for summer work, and that the boys will be ready to commence hoisting next week.

Trinity.

QUARTZ ON NEW RIVER.—Trinity Journal, May 24: Miner writes from New river, under date of May 11th, as follows: "The quartz excitement here, at the present time, is raging furiously, on account of the recent rich strike made by Ladd & Clemens on the Hard Tack ledge. It is, indeed, a big thing. With a hand mortar and a spring-pole attachment they pounded eight flour-sacks of rock and got \$299. The ledge measures sixteen inches at the bottom of the shaft, 14 ft from the surface. Last week they refused \$10,000 for the ledge. All other parties owning ledges here are in readiness to commence operations, and we predict something handsome will be realized from quartz in this section during the summer."

NEVADA.

Washoe District.

YELLOW JACKET.—Enterprise, May 24: The old upper levels continue to yield well in the usual character of ore, keeping the river mills at work. The prospecting operations disclose low-grade ore at several points. While the miners are engaged in extracting the bodies of ore brought to light by the exploring drifts, the prospectors push ahead in search of new deposits. In this way a considerable amount of ore is kept opened up in advance.

HALE AND NORCROSS.—Work has not yet been resumed on the 280 level, where rich ore was found in drifting north. Over 800 tons of ore have been extracted from the newly-discovered deposit on the 200 level. This is taken out through the F street tunnel and placed in the ore dumps near the railroad track ready for shipment to the mills.

BEST AND BELCHER.—The north drift on the 2700 level has reached ground containing a great deal of hot water, and progress is slow. It will probably be necessary to discontinue work at that point for a time, until the hot water drains out, as it heats the drift to such a degree that the temperature is almost unendurable.

GOULD AND CURRY.—Are waiting for the water to drain out of the southeast drift on the 2700 level. The water is decreasing, but it still makes the drift very hot. On the 1200 level two crosscuts have been started east and are passing into favorable formation containing frequent streaks of quartz and seams of clay.

CON. VIRGINIA.—The east drift on the 2900 has

been extended about 30 ft. Are still repairing the U. and C. joint shaft. The material encountered in the drift is the usual vein porphyry. It presents a favorable appearance, being of an open character, with seams of clay and stringers of quartz.

UNION CON.—West crosscut No. 4, recently started, is out about 20 ft. The material is vein porphyry, with a good deal of quartz and clay in seams and streaks. The diamond drill is being run from the face of west crosscut No. 1. As yet it shows but little water.

ALTA.—Drifting west along the diamond drill hole, on the 2150 level. The diamond drill has been set up at the face of the east drift on the 2150 level, and is ready to be started up as soon as the diamonds for the drill are received from New York.

MEXICAN.—The winze on the 3100 level is down about 72 ft. The bottom is in the selvage material lying on the east side of the ore vein. There is a little water in the bottom, but in the last day or two it has not increased in volume.

SIERRA NEVADA.—The northeast drift on the 3100 level has been turned and is now going nearly north. It is in a species of birdseye porphyry, the ground of which is nearly white. The ground is perfectly dry. No other work is at present doing in the mine.

IMPERIAL. The lateral drift is in Alpha ground. It has encountered a great deal of quartz, but this has as yet yielded no assay of much value. The drift has encountered much hard rock during the latter part of its progress.

CROWN POINT.—The usual amount of ore is being extracted, and the mills on the Carson river are kept running to their full capacity. The prospecting drifts are showing a considerable amount of ore at several points.

BELCHER. All work in the old upper levels is going on about as usual. Ore enough being extracted to keep the mills in operation. A considerable amount of work in the way of exploring and prospecting is being done.

CALIFORNIA.—The usual progress is making in the east drift on the 2900 level. The repairs to the C. and C. joint shaft are still continued. The ground passed through continues of a favorable character.

OPHIR.—Are still finding some low grade ore in the filling of the old drifts and other opening on the 250 level. The ore extracted is being worked at the Morgan mill on the Carson river.

UTAH.—During the past week the south drift on the 1950 level has been advanced 30 ft. It is still in vein porphyry with some clay seams and occasional streaks of quartz.

ANDES.—Some low grade ore is being extracted and a good deal of work is being done in the way of exploring and prospecting.

UNION SHAFT.—Are repairing the drain drift on the 1600 level. This drift leads out to the north branch of the Suro tunnel.

SAVAGE.—Good progress is making in the construction of the stone bulkhead in the north drift on the 2600 level.

SCORPIO.—The west drift in the 500 level is still in vein material of a favorable character.

CHOLLAR.—Are preparing to place a stone bulkhead in the drift on the 2600 level.

Columbus District.

MOUNT DIABLO.—*True Fissure*, May 24: During the week the east drift from the north crosscut on the third level, east of the shaft, has been advanced 10 ft, and shows a small streak of good ore. Winze No. 6 is down 93 ft, and there is some low grade ore in the bottom. The west intermediate, between the second and third levels, has been driven 11 ft and shows a small ledge of \$40 ore. In the east intermediate, between the same levels, the north crosscut has been driven 6 ft and the west drift 9 ft. The south crosscut from the east drift on the second level has been advanced 18 ft; total length, 230 ft. The north crosscut from the same drift is in 108 ft. The west drift on the second level shows a small streak of \$80 ore. The raise from the east drift on the first level shows a small amount of \$90 ore. The incline has been sunk 12 ft during the week and is now 143 ft below the third level. Rollers for the rope have been put in from the third level to the shaft and a sheave is being put in the shaft.

COLUMBUS CON.—Operations are still confined to the 150 foot and second levels. Crosscut No. 3 from the main drift on the 150-foot level was extended 5 ft and is now about 43 ft in length. The ground is hard, but is breaking a little more easily. The upraise on the streak of ore encountered in the south crosscut from the same level is now up a distance of 18 ft, and is about 18 ft in width at the top. The width of the ore vein is 2 ft, and the assays average \$60 per ton. The work in the other parts of the mine is confined to getting matters in readiness for future prospecting. But little is being done other than on the levels mentioned.

SILVER BOY.—The appearance of this prospect, which is becoming a mine, improves as the development progresses. The winze from the tunnel level has reached a depth of 30 ft, at which point a drift has been run to the east about 10 ft and is still in ore. A crosscut will soon be started to determine the width of the ledge at the depth attained in the winze. A station has been cut out from about the mouth of the winze and the tunnel extended beyond it 10 ft. From this point a drift has been run to the west a distance of 20 ft, and has encountered a body of good ore.

Eureka District.

NOT SO DULL AS IT SEEMS.—*Sentinel*, May 25: There are fewer men on our streets now than for a long time past. This gives the town an air of greater dullness than is justified by the facts. Many of the men who, a while ago, could be seen about the streets and in the saloons, have taken to the hills and are vigorously at work prospecting for ore, or taking it out and shipping it to the furnaces for reduction. On Prospect mountain, for instance, more miners are agitating earth's bowels than ever before, we believe, in the history of the camp; and the most of them, as we have reported from time to time, are making wages, and some of them, also, getting handsome returns for their labor. Adams Hill is fairly alive with miners, whose number is increasing from day to day, and there is not one of them but is making good wages. A little while ago, for example, the Silver Lick mine was lying idle; now 18 men are tributing in it, several of whom

have fine pitches. It is no bad sign that the number of idle men about town is reduced. They are at work keeping the furnaces alive for the present, and the chances are that among so many prospectors a big mine will be uncovered before winter comes again.

Florence District.

RATTLESNAKE.—*Cor. Virginia Enterprise*, May 25: Rattlesnake, in Florence district, promises to soon loom into prominence. The Louisa, Oliver Twist, Sedan and other claims have fine showings of free-milling ore. Messrs. Streitberger, Bohle, Meyers et al, are the fortunate owners.

Garfield District.

THE NEW FARRINGTON MILL.—*Candelaria True Fissure*, May 24: Archie Farrington is now busy with the erection of a five-stamp mill at a spring on the ground known as the Horse Ranch, about eight miles northwest of Soda Springs. He intends reducing in this mill the ores from his mines in Garfield district, which lies but a few miles northeast. When this is in operation and the smelter at Soda Springs is again started, there cannot be any doubt that there will be a perceptible stir about the station.

Jefferson District.

CHLORIDE ORES.—*Cor. Virginia Enterprise*, May 25: Jefferson, having suffered so fearfully in the endeavors to recover from the blows given it, will employ a few men in the Keystone, St. Charles, Silver Point, Silver Vein, Jefferson, Carbonate and Woodbridge claims. County Recorder Delano, J. Heydon, G. Cook and A. Delano have taken out some very rich chloride ore, carrying free gold visible to the naked eye, from the Woodbridge. This will be worked in the arastra belonging to the Harrison Brothers. W. Garrard, K. Robinson and J. Wilson, having a fair ledge in sight, will work the Keystone mine. Charles Kanrohat is leaching out the ore from his Jefferson Carbonate claim in diminutive home-made leaching works. F. Carrios and J. Enghouse will prospect their properties known as the Silver Vein and Silver Point mines respectively. The Harrison Brothers will work the St. Charles.

Osceola District.

PLACERS.—*Ward Reflex*, May 18: A large number of men are going into Osceola for the purpose of putting in their biggest licks at placer mining while the water lasts, so we are informed by James Matson, who came over from that auriferous region Sunday last. L. Leavitt writes from Osceola to Poujade & Garaghan, who are interested with him, that he commenced sluicing Monday with 100 inches of water, expects much more and has eight men, four on a shift working night and day. He says there are 50 men engaged in placer mining in the district. L. Leavitt left for Osceola Saturday, for the purpose of working his placer claim. The claim he purposes working adjoins the one on which the "Darling" nugget was found in 1877, and which was valued at about \$4,250. It was named after Darling, who was employed on the claim, who found it and attempted to get away with it. He finally "whacked up" with the owners of the claim who got \$2,640 out of it. Such a nugget found in the Cœur d'Alene would set the country wild, but find it in Osceola and it is not worth noticing. Competent judges do not hesitate to say that this isolate placer cannot be worked out in ten years with all the water that can be brought to bear upon it. All it lacks is water. The water is in the neighborhood, but men of means cannot be induced to bring it in.

Reveille District.

LEACHING.—*Cor. Virginia Enterprise*, May 25: Reveille has recently been blessed with a new acquisition. Charles A. Ogden has completed the erection of small but adequate leaching works for parties there. It is believed that the works will be supplied with ore taken from the once famous Gila mine, owned by Governor Adams.

Taylor District.

MONITOR.—*Ward Reflex*, May 18: The Monitor Mining Co. shipped three bars of bullion Tuesday, valued at \$4,993 98. This is the first shipment since the mill started up. When the Argus mill gets to "cross lifting" with the Monitor, a considerable stream of bullion will go out of Taylor district. We hear that another and richer strike has been made in the north end of the Argus Co.'s mine in Taylor district.

Tuscarora District.

A SPLENDID PROSPECT.—*Times-Review*, May 21: The Found Treasure claim near the Commonwealth, has by far the best surface prospect that was ever discovered in the district. At a depth of 18 ft there is a ledge four ft in width, nearly all pay ore, which experienced miners estimate will average \$300 per ton. There is a vein of about eight inches which will probably work upwards of a thousand dollars. The ore is mostly a gray chloride, although near the bottom of the incline on the foot wall there is a streak of rich sulphurets coming in, which is gradually widening and which will probably, when sufficient depth is attained, fill the entire space between the walls. On the surface the ledge was twisted and broken, although interspersed with small veins of rich ore, but upon sinking a few ft it became solid and uniform, with well defined walls which have continued unbroken and of a regular pitch of about 45 degrees as far as the incline has been sunk. It has every appearance of a true fissure vein, and miners who have examined it are unanimous in the declaration that it surpasses anything, so far as prospected, that was ever struck in Tuscarora. The location is owned by Mrs. Eliza Graham. A short time ago she leased it for six months to Joseph McGowan who has made the recent developments, and the probabilities are that the lessee as well as the owner will realize handsomely out of the property.

THE MAYFLOWER PROSPECT.—*Times-Review*: The owners of the Mayflower location are sinking an incline on their ledge about 200 ft southeast of the Found Treasure workings. They are down about 12 ft and have a strong ledge with a small vein of rich chloride ore which is however gradually widening and which they believe will develop into a body of sufficient dimensions to be profitably worked. The ore is the same as that in the Found Treasure, and it is undoubtedly the same ledge. The locators are determined to thoroughly prospect their claim, and are confident that they will be well paid for their labor in the end.

Tyler District.

WILL START UP.—*Cor. Virginia Enterprise*,

May 25: Tybo, though comparatively inactive, will start up on 2 G carbonate and galena ore on the return of Supt. N. S. Frowbridge. Lively times may then be expected, as the mine never looked better.

Ward District.

MARTIN WHITE.—*Ward Reflex*, May 18: We have heard no report here that the Martin White mine will close on account of a suit by Martin White against the company. As we understand it, the judgment is against individual members of the Board, and that it in no way affects the mine. The contract made with Martin White, which he claims was "breached," was not an official act of the Board.

Willow Creek District.

FINE PROSPECTS.—*Silver State*, May 24: Thomas Edwards returned yesterday from a visit to the Willow Creek mines. He reports considerable activity in the camp, and the prospects bright. An Arizona expert is now in the district in the interest of a New York company, and he will remain a week or more looking at the mines. Judge Harlan has a force of men taking out ore in the Golden Era mine, and, as soon as the road which is being built to the mine is completed, he will start the mill. Andy Shrewsbury is at work on a gold-bearing ledge which is supposed to be the same as the Penobscot Boy. It is about thirty ft wide, and rich in gold. The Penobscot Boy, owned by McPhetres & Co., is sixty or seventy ft wide, with gold in paying quantities all through the ore. Supt. Mayon was waiting for tools and supplies to commence work on the Pauline, one of the Eureka Company's mines. He intends to start in on the lead, which crops out low down in a ravine, and follow it into the hill. Yesterday Elias Jones' team left here with tools and other articles for the Pauline, and work will probably be commenced on the lead next Monday. Mr. L. Edwards says the surface prospects indicate large and rich leads, but, as yet, none of them have been opened to any great depth. The gold-bearing leads are generally very large, and, besides these, there are promising silver mines in the district, among them the Ohio, which has produced considerable ore.

COLORADO.

THE MINES AT EMPIRE.—*Cor. Colorado Miner*, May 24: The Bay State mill started up on Wednesday, and bids fair to give the miner pay for his labor while developing his property. Young and Thomas are getting out fine milling ore from the Great Equator, on Silver mountain. The Ingersoll, on Covode mountain, has a one hundred foot shaft, with a fourteen foot drift near the bottom where the crevice is three ft wide, bearing iron, galena and carbonate of copper. Assays from this lode have run from 107 to 149 ounces silver, and from 1 to 2½ ounces in gold per ton. Mill runs from this property have averaged \$51 per ton. The Rara Avis, owned by Monck & Baker, has a shaft 45 ft in depth on a crevice about ten ft wide, discovered little more than a year ago. A rich flow of silver glance had been found from time to time in the vicinity of this property, but until February, 1883, was never found in place. Assays from the Rara Avis at four or five ft deep have given as high as 369 ounces silver per ton. An extension, west, called Bonanza, owned by Smith and Baird, promises well, specimens from which, assayed for gold and silver, gave 6 to 10 ozs. gold and 151 ounces silver per ton. There is only about forty ft of development on this property. The Windsor, now being worked by Husted & Co., is improving fast as depth is gained. The upper drift is ninety ft in length, forty-five ft below which is another one hundred ft in length, where they are now working. The crevice at the breast is four ft wide, with a pay streak one foot wide, of iron bearing galena and yellow copper.

DUMONT MINES.—An inferior pump at the Albro mine has impeded the working of the shaft for some days. Another pump has been substituted. One carload of smelting ore was shipped to Denver this week. Al. Penery, lessee on the Standard lode, informs our reporter that he now has stuff that will run sixty ounces gold to the ton. He seemed somewhat reticent, so our reporter turned away a weary gleaner. Will interview him when he has a run. The last mill-run from the Lee gave the following: 3 3-ro ounces gold, 12 ounces silver, and 2 per cent copper to the ton. A mill-run from the Syndicate mine last week gave the following: 152 ounces silver and 99 ounces silver to the ton, according to class. Good Luck, owned by Baumgarten & Freidlander, adit on line, forty ft. A shaft has been sunk to a depth of fifty ft at the breast of the adit, the bottom showing both walls. The hanging wall carries a ten-inch vein of nearly solid ore. The foot wall carries a four-inch vein of solid ore, the character of which is galena, iron pyrites and psilomelane.

GRAND COUNTY MINES.—*Prospector*, May 22: Work has been commenced on Willow creek and the probabilities are that something will be developed. Messrs. Westcott and Miner, who have just returned, bring some very fine specimens of placer gold. They are extremely sanguine, and will return as soon as they can procure lumber to make sluice boxes, etc. Mr. Frank Miner informs us that he can make good wages with a rocker. Parties at Empire have been making negotiations with Lehman, Spurgeon and Arnold for 100,000 ft of lumber to be delivered on Willow creek, to be used in the construction of sluice boxes, flumes, etc. Caswell, Pollard & Co. will begin work on their placers as soon as the snow goes off.

IDAHO.

THE MINERVA.—*Ketchum Keystone*, May 20: The strike made on the dividing range between the Elkhorn and the North Star mines by Hillebrand and Donski, has been named the Minerva, and proves to be one of the finest leads in the section. The ledge, fully developed, is ten ft wide and carries a fine ten-inch vein of solid galena. Float was found on a claim located below the Minerva for working facilities and yesterday, after two days' work, a second ledge was discovered carrying green, blue and dark sulphurets, very heavy, and possessing every indication of excellent the former. This claim has been named the Triumph. The Minerva is very probably a continuation of the North Star mine. It has been traced and uncovered at distances of 500 ft. Messrs. Donski and Hillebrand, the lucky owners, were in Ketchum to-day laying in supplies. They

have several more prospects in the East Fork region, but will not forget to develop the Minerva and Triumph lodes as these surpass anything else they have discovered.

A NEW DISCOVERY. *Ketchum Keystone*, May 24: Messrs. Connors and Spainhour came in from the Elkhorn vicinity with the good news of another strike. They were prospecting the hill opposite the Parker, north, and struck a blind ledge under the surface when it cropped out with good walls about three and a half ft apart. The vein is about 10 inches containing some fine ore.

MONTANA.

CLEAR UP.—*New Northwest*, May 29: The Kelley Hagan & Co., mine, on Pioneer Gulch cleaned up last week \$2,568.75, the first of the season, this being the result of the work of two Little Giants on the upper line of the claim. Last Monday a complete rig of two more Giants were started up near the center of the ground, which promise fully as good results. With the most complete appliances for Placer mining, including four Giants, constantly at work, it will take from twelve to fifteen years to work out this one claim.

THE MOULTON DIVIDEND.—*Inter-Mountain*: The payment of a \$20,000 dividend by the Moulton Mining company is a matter for congratulation. It is an honest dividend, honestly earned from the operation of a meritorious mine. The Moulton is not a high grade property, but it has been skillfully and economically developed. Not long ago it was heavily in debt, almost as much so as the Alice, but when it once was put on a paying basis its earnings were applied to the liquidation of the debt and no dividend was thought of until the encumbrance was cleared. The dividend has not been paid in order to enable money lenders to continue drawing interest on the company's notes and overdraft, but because the mine is on a paying basis, because there is in sight in the mine enough ore to insure continuous profits, and because Mr. W. A. Clark recognizes the rights of stockholders to a share in the profits of the mine. The Moulton will hereafter be a dividend paying mine, and it will be worked in Butte not in New York.

PHILLIPSBURG.—The San Francisco is a mineral deposit, now securely entrenched between two perfect quartz walls, shows decided improvement with every foot of development gained. The granite horse, (previously noted) has been completely cut out and the header shows three feet of solid ore with clay casings on both walls. The entire length of ore shute presented by the tunnel to date is 109 ft, and the assay throughout shows the rock to be of a profitable milling character. Noticing John Ullery digging in the waste dump yesterday, upon inquiry, I ascertained that at least 100 tons of good rock had been carelessly covered up during the past winter.

WINGER. No. 2.—McDonald & Company have struck high grade rock in the 50 ft cross-cut of this mine and have about 75 tons of ore on the dump. There is no incentive to cause the owners of the Winger to hoist pay ore, as it is impossible to get it worked in the camp, and it must be shipped to either Butte or Anaconda to be made productive this summer.

NEW MEXICO.

CHLORIDE CHRONICLES.—*Black Range*, May 24: Messrs. Caldwell and Gillem are doing assessment work for 1884 on the Mountain King mine, on upper Chloride creek. Three men are stopping ore from the Colossal. Nobody cares to take a new contract on the shaft without machinery to keep down the water. Charley Ridgely and Bob Norton are sinking twelve ft in the last shaft sunk on the Midnight, on contract. This will make the upper shaft 22 ft deep. Every foot gained in depth improves the quantity and quality of the ore, and increases the value of the property. On the dump of the King No. 2 mine there are several tons of shipping ore. When the wagon-road up Iyer's run, which M. H. Chamberlin and Fred Stevens are now at work upon is completed, this rich ore will be brought down and sold to Mr. Castle for shipment. The short season of work of the Silver Monument mine and the two weeks' work of the concentrator have already made a noable improvement in the finances of this camp. A few weeks more of the same will put Chloride on a high wave of prosperity.

THE REDUCTION SITE.—*Silver City Enterprise*: After ten days' delay the site for the new concentrating and reduction works has been secured, and the work of construction is being rapidly pushed forward. The promoters were disappointed in not obtaining the site promised them by a representative of the railroad company, but are satisfied in securing the next eligible location. Arrangements have been made with John Brock for the site below the Carrollton mill, and the property has been purchased for a nominal sum. It is convenient and suitable for the works, a sufficient supply of water for all necessary purposes being easily obtained. The machinery from Oak Grove has arrived and is being erected. The True vanners and Rapid ore concentrators will be ordered immediately and Mr. Norton informs us that the works will be rapidly constructed, and that, too, without further delay. The shaft of the Nugget mine, on which the Williams boys are working, has attained a depth of 140 ft, and it is estimated that 60 ft more will reach the ore body. A new whim has been ordered and will be erected as soon as it arrives. The shaft is being sunk at the rate of two and a half ft per day. Five tons of concentrates from the Cooney mine arrived in town from Alma, Monday. The regularity with which concentrates arrive from this excellent property is a better card for the camp than all the "blowing up" it could have through the papers. The Cooney mine is a success. Messrs. Frost, Waller and McDonald made another shipment of four carloads of ore from the Two lkes mine, in Chloride flat, on Tuesday. The ore is about the same grade as the thirty-six tons recently shipped from the same property by these gentlemen and which netted them 102 ounces per ton. Fifteen miners are employed upon this property and regular shipments of ore will continue until sampling and reduction works are erected here. Some very rich ore, containing native silver and argentine, has been struck in the Good Hope mine, at Bullard's Peak, owned by H. M. Carpenter, and upon which work is now progressing steadily.

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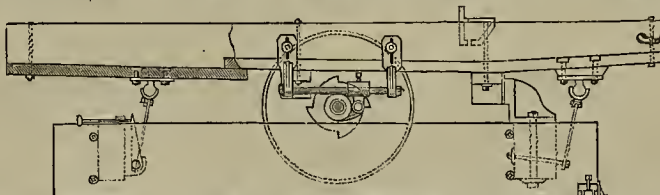
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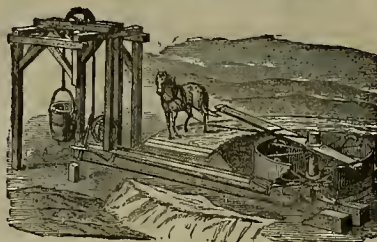
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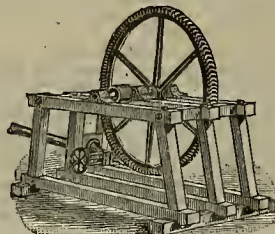
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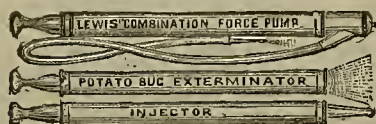
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[From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.]

FOR WEEK ENDING MAY 20, 1884.

298,812.—TOPOGRAPHICAL MODEL—C. L. Anderson, S. F.
298,835.—GAME COUNTER—Frank Dayton, Portland, Or.
298,734.—APPARATUS FOR REDUCING SULPHUR—F. Dickert, Salt Lake, U. T.
298,844.—BOTTOMS FOR BOOTS OR SHOES—C. F. Glanville, S. F.
299,068.—OIL CAN—J. A. Griswold, S. F.
298,746.—FIGURE AND CHART FOR EDUCATIONAL PURPOSES—Mary E. Guirey, S. F.
298,752.—NECKTIE FASTENER—P. H. Higgins, Merced, Cal.
299,084.—HOISTING APPARATUS—W. F. Murray, S. F.
298,888.—BORDER LIGHT FOR THEATRES—J. T. Preddy, Carson, Nev.
299,009.—CARTRIDGE LOADING APPARATUS—Quinan, Kimpfel & Olsen, S. F.
298,793.—TANK FOR WINDMILLS—H. R. Stevens, Los Angeles, Cal.
298,915.—OIL CUP—W. H. Thomas, Santa Ana, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CARTRIDGE LOADING APPARATUS.—Wm. R. Quinan and Frank Kimpfel, S. F., and Jacob Olsen, Marin Co. No. 299,009. Dated May 20, 1884. This is an apparatus for packing nitro-glycerine powders and other pulverulent substances into cartridges or tubular cases made of paper or other material. This packing is usually done by hand, one cartridge at a time. The object of the invention is to produce a machine which may be operated by hand or power in which a number of cartridges can be packed at one operation with the same safety as ordinary hand-work. The principle of the invention may be illustrated by an open-topped box, within which a system of parallel rods pass through two opposite sides near the bottom. The box is filled with powder and the rods being drawn back until their ends are well within the box and then pushed forward, each rod will carry a charge of powder through the opposite hole and into the cartridges, which are held on short tubes projecting outward from the holes. A succession of strokes fills the cartridges, packing each charge until the whole cartridge is filled and packed.

NAUTICAL PARALLEL RULER.—Chas. Hutchinson, S. F. No. 298,471. Dated May 13, 1884. This is a nautical instrument more particularly useful for shaping courses and taking cross bearings. It consists of parallel rulers upon which is pivoted a plate marked with the points of the compass, and adapted to turn thereon, and an arc or arcs adapted to indicate the angle or degree of variation to which the compass is turned. The object of the invention is to provide an instrument adapted for use in shaping courses and taking cross bearings, in the use of which there will be no liability of mistake, and which can be handled easily and rapidly.

MACHINE FOR CASTING LEADS ON FISH NET LINES.—Erick Manula, Astoria, Oregon. No. 295,262. Dated March 18, 1884. This invention relates to a new and useful machine for casting the leads or sinkers on the lines which go to form fish nets; and it consists in a peculiar reel or winch upon which the line is wound, and having its circumference constructed to form one-half the matrix in which the line lies, and a projecting arm under which the reel passes forming the other half. It consists, also, in the means for conducting the molten metal into the matrix and cutting it off, and the means for clamping the two parts together during the casting.

TWO WHEELED VEHICLE.—Wm. T. Goodman, Fulton, Sonoma Co., Cal. No. 296,949. Dated April 15, 1884. This is an invention for preventing the rocking motion imparted to these vehicles by the joggling of the horse. The improvements consist in the arrangement and connection of springs, the means for mounting the body thereon, and a novel connection between the springs, axle and shaft. In this cart the body may move readily independent of the springs to a certain degree. On account of the character of the springs themselves and the manner in which the body is hung, the vehicle is an easy riding one.

BOTTOM FOR BOOTS AND SHOES.—Conrad F. Glanville, S. F., assignor of one-half to Wm. H. Yeo. No. 298,844. Dated May 20, 1884. This improvement in making the bottoms of boots and shoes consists of a flange or rim of rubber interposed between the inner and outer soles, so as to form an in-

closed air space between the central portions of these soles within which is also placed a spring or springs. The rubber casing and spring make the boot more easy to the foot, and at the same time prevent the leather from cracking and strains on the stitches, and cause it to wear longer.

HOISTING APPARATUS.—Wm. F. Murray, San Francisco. No. 299,084. Dated May 20, 1884. This invention relates to a hoisting apparatus and a means by which the rope-winding drum is thrown into or out of contact or action with the driving gear; and it consists of a frictional device between the drum and gear, a stem or spiral extending into the hollow drum shaft, so as to act through appropriate connection upon the drum itself, and an eccentric or cam and gearing by which the stem may be caused to act or be relieved, and a means for compensating for wear of the frictional surfaces.

BUTTON.—Napoleon B. Hale, San Bernardino Co. No. 293,082. Dated May 6, 1884. This invention relates to a new and useful button of that class on which the stem or shank is provided with a sliding or swinging cross-head, whereby the button may be readily inserted and secured in place. The shank and cross-head are both made flat, and the latter of spring material. The object is to provide a button of simple construction, which may be easily inserted and fastened. The improvements are applicable to any and all kinds of buttons whether to be used for cuffs, collars or other garments.

HORSE COLLAR.—Charles Staufenheil, San Luis Obispo Co., No. 29,8126. Dated May 6, 1884. These improvements consist in making the collar in two equal parts, joining at the neck or throat; in a peculiar flexible joint at these points, and means for adjusting the joints to increase or diminish the size of the collar; the means for securing the joints; in peculiarly located seams to increase the space between the rim and belly for the better security of the harness, and in a peculiar lining to prevent displacement of the stuffing.

COLLAR.—Alexander J. McAdam and Neil L. McAdam, S. F. No. 298,489. Dated March 13, 1884. This invention relates to a new and unique improvement in shirt collars, the object of which is to prevent the cravat or necktie from getting out of position. The collar has two slots or openings in its back below the corner edge of the neck-band portion, one being on each side of the back button hole. The neck-band of the cravat is passed through the slot openings so the cravat cannot move upwards.

TRAVELING BAG.—Chas. A. Zinkand, San Francisco. No. 298,050. Dated May 6, 1884. The invention relates to the class of traveling-bags including valises, satchels, etc. in which the two sides open upon a longitudinal central, pivot line or hinge at the bottom. The invention consists, in connection with the bar which forms the hinge on the inside, of a bar connected with its ends and extending parallel with it, but on the outside, said bar forming a protection of the bag, and the two bars forming a fastening for the linings, the edges of which are inserted between them.

PATTON'S CONCENTRATOR.—Mr. P. Easton, of Sonoma, Tuolumne Co., writes to Mr. C. W. Patton as follows: "I can say of your concentrator that it is good for what it is recommended to do. It will save the sulphurets from a five-stamp battery well. I send you sample of the sulphurets as they come from the concentrator, and have two tons of this description. I fully endorse what Mr. J. H. Neal says about your machine. Every millman ought to have one."

LAP BOARD.—Adam L. Anthony, Placerville, El Dorado Co., Cal. No. 296,219. Dated April 22, 1884. The improvement consists in sliding sides or leaves and in hinged corners, whereby the lap board may be closed up to smaller dimensions, either for convenience in use or transportation. The object is to provide an extensible lap board which may be adjusted to different sizes and closed up for transportation.

LAMP BRACKETS.—Alfred Thurher, Concord, Contra Costa Co., Cal. No. 297,317. Dated April 22, 1884. This invention relates to a bracket or support for lamps; and it consists of an arm pivoted or suspended and having an automatic clamp at its outer end, the jaws of which are so constructed as to open and admit the shank or top of the lamp when it is presented, and close to hold it suspended.

SAW SWAGE.—Simon Kinney, S. F. No. 297,696. Dated April 29, 1884. This is a saw swage of that class in which, through compound levers, power is acquired to operate clamping devices to hold the sides of the tooth and pressure devices to swage it. The object of the invention is to provide a machine adapted to receive, clamp and swage a saw tooth to the best advantage and with small exercise of the original power.

LAND ROLLER.—Kinzy W. Jones, Lemoore, Tulare county, Cal. No. 298,475. Dated May 13, 1884. This is a roller for agricultural purposes. The main frame has two rollers, and is combined with a forward frame having one roller, by means of iron connecting arms, the method of construction being peculiar.

Brain Work Needed Everywhere.

An erroneous opinion has got abroad among mechanics that the wonderful progress which has been made in machinery of late years, has to a large extent, done away with the necessity which formerly existed, of a thorough manual training in the shop—such a training as was obtained through the old-time apprentice system. A similar idea has also been obtained in regard to the present need of brain-work in the shop. The fact is there never was a time in the history and progress of the mechanic arts when there was greater need of careful and trained manipulation, combined with the highest order of brain work than now. No machinery can be properly cared for and advantageously run without a previous thorough manual training. A person in charge of machinery should have a well trained "mechanical eye," the ability to see, as it were, "right through any intricacies that may be connected therewith, and a faculty for readily "fixing things" when anything gets out of fix, or goes wrong, as the very best of machinery will sometimes do.

Then again, to run machinery so as to keep it in order and do good work, the operator must have in addition to a knowledge of the working and construction of the instrument, some idea of the mechanical forces which are thereby called into exercise, he must have a thorough technical education to supplement his manual dexterity. This necessitates general education, thought, brain work. The statement is often made that good common sense is better than a college education. The underlying fact is that neither is of much account without the other. A collegiate education, to be really valuable should stand on a basis of good common sense or *vice versa*. One of the most difficult things to impress upon the mind of the average graduates of either the high school or the college, is the fact that all school education is but a foundation upon which to build the real practical education, by the use of which we must work our way through life. Our success in life will depend more upon the development of the latter than the former. When a young man has sense enough to appreciate this fact, and the application to use his opportunity to the best advantage, you may rely upon it that he will rise to something above mediocrity even in the most eminently practical community in the land.

There are but few so constituted by nature that they will make the necessary effort to rise as mechanics. The number is so few that with all the scramble and competition in our most crowded communities, there is an abundance of room for those who will make the proper effort—"there is always room at the top of the ladder."

The constant improvement in machinery and in the practical arts and sciences, and not less so in the learned professions, keeps up a constant demand on all the various resources of knowledge and thought. In the shop, on the farm, at the mine, in the factory, in the study and in the offices of the various learned professions, brain work is in constant demand, and our own State and the country at large is chargeable with the most gross neglect in failing to properly appreciate these facts and in neglecting to provide the means for meeting the demands of the age for a more practical system of education than can be obtained in our ordinary schools and colleges.

The State is amply able to meet this demand for technical schools, and the pressing importance and growing desire on the part of the public to avail itself of such advantages would fill them with eager pupils. The cost of such schools would be repaid to the State an hundred fold by the new and improved spirit which it would inspire in our shops, and, in fact, in all the various industrial walks of the community. The English and Continental nations are far ahead of us in these things, and the superior training to which European mechanics have been subjected is fast filling our workshops and factories with workmen from abroad, who are gradually crowding out our own people from the various avenues of labor where special skill is required. This ought not to be. It is the duty of our rulers to see that our labor is protected in this direction, as well as in those ways which are regulated by tariffs. The former is the cheaper and most effective mode of protecting and encouraging labor.

In referring to the importance of technical

education, a recent English exchange very truthfully says: "The whole world is now an open field of competition for the best men, and the records of engineering classes bear good testimony to the value of the special preparation they have had. The world is being made better and more comfortable to live in every day, by the quiet, persevering, and scarcely appreciated labors of engineers and chemists; and in the problems that are to be solved, where the great forces of nature and the present waste through ignorance are to be further utilized, the graduates of our scientific schools and colleges will be the men whose brains and hand will serve their fellow men to good purpose."

News in Brief.

ALL accounts indicate that thus far the crop prospects are wonderfully good in Manitoba and the Northwest.

BETWEEN 3,000 and 4,000 pounds of cherries are shipped daily from General Bidwell's orchards.

THE total number of prisoners in the branch prison at Folsom is 460. The prison is large enough to accommodate 600.

THE number of British visitors to the United States and Canada this summer promises to be unprecedented.

THE streams in British Columbia are lower than for years at this time of the year, and damage to the crops is feared.

A VETERINARY SURGEON appointed by the Supervisors of Solano county has made a tour of the farms, and reports the discovery of numerous cases of glanders in horses.

IN the City of New York alone it is estimated that there are at present no fewer than 400 millionaires, 30 of whom own from \$5,000,000 to \$50,000,000 apiece, while there are about 10 who possess from \$50,000,000 to \$150,000,000 each.

MOST of the 200 colored farm laborers who recently left Chattanooga, Tenn., for California, will come to work for J. B. Haggins, who intends to give the problem of cotton raising in this State a thorough trial. Of the lot of colored laborers previously brought here a majority are waiting on Mr. Haggins' farm for the crop to come forward.

REPORTS from a thousand correspondents of the *National Press and Bottlers' Advocate*, from all parts of the United States, in regard to the fruit crop, say: The apple crop is the largest ever known. There will be only a half crop of peaches and pears, but the prospect of a very large crop of small fruits is very good.

F. W. MARSHALL, a son of Attorney-General Marshall, has paid the Alameda County Treasurer \$53,757.53 collected from the C. P. R. Co., for State and county taxes for the fiscal years 1880-81 and 1881-82, being the full amount sued for by Alameda county for those years. This payment does not include penalties or interest.

Secure the Reduced Rate.

After the first of April, 1884, we announced a reduction of the price of the MINING AND SCIENTIFIC PRESS from \$4 to \$3 a year to all who would settle up arrearages at old rates and pay in advance thereafter. There are some who have not yet taken advantage of this offer, and we would therefore urge all subscribers still in arrears to remit what is due us to this date, at the rate of \$4 a year, and pay in advance for another term at the reduced rates for new subscriptions paid in advance.

How to Remit to this Office.

ALWAYS GIVE THE NAME OF YOUR POSTOFFICE every time you write to us for any purpose. We cannot find your name on our large lists unless you do. Also write your own name plainly, and the name of the paper you remit for.

THERE ARE FOUR WAYS BY WHICH MONEY, in payment for this paper, can be sent by mail at our risk—by a POSTOFFICE MONEY ORDER, by a REGISTERED LETTER, by a BANK DRAFT, or by a POSTAL NOTE. MONEY ORDERS CAN BE OBTAINED at the Postoffices of most of the large towns. For the small amount of eight cents you can buy a Money Order upon the San Francisco Postoffice, for the amount you wish to send us, and we will be responsible for its safe arrival. REGISTERED LETTERS.—If a Money Order Postoffice is not within your reach, ask the Postmaster of your town to register the letter you wish to send us. It costs but ten cents. Then, if the letter is lost or stolen, it can be traced. You send money in this way AT OUR RISK.

BANK DRAFTS.—A Draft upon any San Francisco, New York, or Washington, D. C. bank, we can use, if it is made payable to the order of the publishers of this paper, San Francisco.

POSTAL NOTES CAN BE OBTAINED for sums less than five dollars at all Postoffice Money Order Offices. For a Postal Note you must pay three cents, and the Postal Note must be inclosed in your letter to us. These Postal Notes are payable to bearer, and therefore ARE NOT SO SAFE AS A MONEY ORDER.

SMALL SUMS of money generally reach us in an ordinary letter, but we cannot be responsible for losses unless you send in one of the four ways mentioned above. SILVER BY MAIL.—Do not send over 25 cents in silver by mail unless you wrap it carefully, and put an extra three-cent stamp on the letter for every 50 cents in silver it contains. Failure to observe this may cause your letter to get lost.

POSTAGE STAMPS will be received in full payment or for fractional parts of a dollar for subscriptions of the denomination of one and two cents.

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Lost Papers.

If any subscriber fails to receive this paper promptly, after making due inquiries at the Postoffice, he is urgently requested to notify this office by letter, that we may send the missing papers, and, if possible, guard against further regularities.

Mining Share Market.

The market for mining stocks has maintained its usual quietness this week as of late. No transactions of special note have occurred. At the north end of the Comstock active prospecting is in progress at several points, and discoveries of value are liable to be made at any time. In Union Consolidated and Sierra Nevada, along the line of the main north and south drift, some 10 or 12 crosscuts have been started and run out a certain distance east and west. In several of these the diamond drill has been sent ahead for long distances. Presently a start will be made in some of these beginnings of crosscuts. West crosscut No. 4, in Union Consolidated ground, now out 20 feet, is showing a very lively mixture of quartz, clay and porphyry.

At the Hale and Norcross work has not yet been resumed on the 2800 level. Much ore is being extracted from the newly discovered body on the 200 level, and there is now in the dumps over 800 tons.

At Gold Hill the leading mines are still finding a good deal of low grade ore, keeping all the mills on the Carson river running to their full capacity. At the Alta the main west drift on the 2150 level is again being pushed ahead. The diamond drill is now in position at the face of the east drift on the 2150 level, and will be started up as soon as the diamonds arrive that were telegraphed for to New York.

Bullion Shipments.

Hanauer, May 20, \$1,950; Horn Silver, \$12,000; Hanauer, 24, \$7,410; Horn Silver, 22, \$3,000; do., 23, \$6,000; Stormont, 24, \$3,370; Horn Silver, 24, \$9,000; do., 25, \$9,000; Bodie Con., 27, \$17,228; Navajo, 26, \$3,200; Bonanza King, 26, \$7,654. The banks of Salt Lake report the receipts for the week ending May 21st, inclusive, of \$67,000 in bullion.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, May 29, 1884.

ANTIMONY Per pound.....	14 1/2	15
Bismuth Per Pound (extra).....	16 1/2	17
IRONS—Glenbrook, ton.....	254 00	—
Edginton, ton.....	20 00	—
American Soft, ton.....	29 00	—
Oregon Pig, ton.....	37 50	38 00
Refined Bar.....	24 1/2	3
Horn Silver, keg.....	5 50	6
Nal Rod.....	7 1/2	—
Silver, according to thickness.....	5 1/2	7 1/2
Sheet, English 14, on 500 bags.....	15 00	16
Black Diamond, ordinary sizes.....	14 00	—
Drill.....	15 00	—
Machinery.....	12 00	14
COPPER—Ingot.....	22 1/2	—
Brokers' sales.....	25 00	27
Fire box sheets.....	28 00	—
Holt.....	25 00	—
Oil.....	8 00	—
Hat.....	12 00	—
Comet, 100 lbs.....	41 00	4
LEAD—Pig.....	41 00	6
Bar.....	7 00	—
Pipe.....	8 00	—
Sheet.....	7 1/2	—
Shot, discount 10% on 500 bags.....	2 10	—
Buck, 1/2 bag.....	2 10	—
Chilled, do.....	2 10	—
TIN PLATES—Charcoal.....	7 00	7 25
Coke.....	6 00	6 75
I. C. Charcoal Roofing, 14x20.....	6 15	6 50
ZINC—By the cask.....	19 00	—
Sheet, 14x16, 7 to 10 lb. less the cask.....	9 00	10
NAILS—Assorted sizes.....	3 25	—
QUICKSILVER—By the flask.....	2 00	—
Flasks, new.....	1 05	—
Flasks, old.....	85 00	—

Coal.

From the circular of J. W. Harrison, coal and metal broker, dated May 24th, we take the following concerning cargo lots of coal: Among the transactions of the week there is nothing very encouraging to report. Imports from our Coast Collieries for the week foot up 10,350 tons; from Great Britain and Australia, 3,322 tons; among the latter arrivals is a cargo of Mount Kembla steam coal, mined about 30 miles below Sydney. It is indorsed very highly by consumers there, and this cargo has been imported with a view to its general introduction here, as a substitution for Coal Cliff and Bulli. Samples can be seen at my office.

Some few cargoes of Foreign Coal have been ordered at full figures for early loading, and some offers for more are in hand at a shade lower, which remain unaccepted, so that it may be safely predicted no lower quotations will rule for some time. Some references through the press have been made lately about Anthracite discoveries in Mexico. It will be many years, if ever, before they will make any showing in our market; their location is too remote, and samples shown are of inferior grade.

SPOT PRICES.

Australian.....	7 00	Cardiff.....	7 50
Liverpool Steam.....	7 00	Lehigh Lump.....	13 00
West Hartley.....	8 50	Cumberland, bulk.....	10 00
Scotch Splint.....	8 00	Egg, hard.....	11 00

PRICES "TO ARRIVE."

Australian.....	8 75	Cardiff.....	8 75
Liverpool Steam.....	7 50	Lehigh Lump.....	12 50
West Hartley.....	7 50	Cumberland, bk.....	9 50
Scotch Splint.....	7 25	Egg, hard.....	10 00

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send not a few but worthy men.

JARED G. HOAG—California.
J. J. BARTLEY—Sacramento county.
A. S. DENNIS—San Mateo county.
C. C. KNOX—Sonoma, Lake and Mendocino counties.
A. D. McDUFFIE—Sacramento county.
JOHN H. STURCKE—Santa Clara county.
B. W. CROWELL—Fresno and Tulare counties.
J. W. RILEY—Stanislaus and Merced counties.
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N. PASCOE.

MINING SHAREHOLDERS' DIRECTORY.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Ames S. M. Co.	Nevada, 24.	25.	Apr 15, May 19.	J. G. Harris.	309 Montgomery at
Argenta M. Co.	Nevada, 17.	10.	Apr 16, May 20.	E. M. Hale.	327 Pine at
C. & B. Belcher M. Co.	Nevada, 22.	50.	Apr 16, May 21.	J. W. Williams.	309 Montgomery at
Belmont M. Co.	Nevada, 22.	50.	Apr 16, May 21.	J. W. Williams.	310 Pine at
Bullion M. Co.	Nevada, 22.	25.	May 19, June 20.	J. M. Brazell.	328 Montgomery at
Butte Creek Hyd. M. Co.	California, 9.	10.	May 13, July 10.	B. L. Taylor.	320 Montgomery at
California M. Co.	Nevada, 12.	20.	May 20, June 27.	J. T. Gordon.	309 Montgomery at
Cueva Santa M. Co.	Mexico, 2.	10.	May 19, June 21.	J. W. Letts Oliver.	328 Montgomery at
Con Imperial M. Co.	Nevada, 16.	05.	Apr 16, June 30.	J. W. Peck.	309 Montgomery at
Champion M. Co.	California, 12.	15.	May 7, June 12.	J. B. Burris.	339 Montgomery at
Chollar M. Co.	Nevada, 13.	50.	Apr 11, May 23.	J. W. Dean.	309 Montgomery at
Excelsior Water Co.	Nevada, 12.	20.	May 2, June 7.	D. C. Bates.	309 Montgomery at
Excelsior M. Co.	Nevada, 20.	20.	May 2, June 11.	H. B. Wheaton.	325 Sansome at
Equitable Tunnel M. Co.	Utah, 23.	10.	Feb 12, May 26.	W. Van Bokkelen.	419 California at
Eintracht Gravel M. Co.	California, 15.	25.	May 16, June 28.	H. M. Knux.	209 Sansome at
Goldfield Tunnel Drift M. Co.	California, 1.	1.	May 22, June 23.	J. A. P. Paul.	328 Montgomery at
Grand Trunk M. Co.	Nevada, 16.	75.	May 10, June 12.	J. P. Lightner.	309 Montgomery at
Hale & Norcross S. M. Co.	Nevada, 82.	75.	May 10, June 12.	J. P. Lightner.	309 Montgomery at
Indian Spring Drift M. Co.	California, 2.	10.	May 21, June 23.	J. A. H. Jones.	328 Montgomery at
Loreto M. and M. Co.	Mexico, 7.	10.	May 9, June 12.	J. J. Moritz.	328 Montgomery at
Mayflower M. Co.	California, 24.	10.	May 7, June 10.	E. W. Levy.	309 Montgomery at
McElroy Gravel M. Co.	California, 11.	10.	Apr 16, May 20.	J. C. Elliott.	309 Montgomery at
McElroy G. M. Co.	Nevada, 25.	50.	Apr 16, May 17.	J. H. Wells.	309 Montgomery at
Peartree M. Co.	California, 10.	10.	Apr 15, May 10.	J. H. Jordan.	314 Montgomery at
Santa Nevada M. Co.	Nevada, 74.	10.	May 10, June 12.	J. R. Parker.	309 Montgomery at
Segregated Belcher M. Co.	Nevada, 23.	1.00.	May 9, June 11.	J. G. Edwards.	414 California at
Tilden M. Co.	Nevada, 3.	05.	Apr 15, May 19.	J. C. V. Hubbard.	310 Pine at

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Caladonia M. Co.	Nevada.	W. Letts Oliver.	328 Montgomery st.	Annual.	June 3
Cabaria M. Co.	Nevada.	W. J. Taylor.	220 Sansome st.	Annual.	June 3
Excelsior Deep Gravel M. Co.	California.	T. J. Watson.	116 Davis st.	Annual.	June 5
Guyonere M. Co.	Nevada.	G. R. Watson.	126 Kearny st.	Annual.	June 3
Excelsior M. Co.	Nevada.	C. C. Harvey.	309 California st.	Annual.	June 3
Summers' Coal M. Co.	Nevada.	F. E. Luby.	380 Pine at	Annual.	June 9

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Bonanza King M. Co.	California.	D. C. Bates.	309 Montgomery st.	25.	May 15
Bodie Con. M. Co.	California.	G. W. Scott.	309 Montgomery st.	50.	June 5
Derbec Blue Gravel M. Co.	California.	T. Wetzel.	522 Montgomery st.	10.	May 27
Idaho M. Co.	California.	T. Wetzel.	522 Montgomery st.	4.00.	Apr 2
Jackson M. Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar 16
Kentuck M. Co.	Nevada.	J. W. Peck.	310 Pine st.	10.	May 19
Paradise Valley M. Co.	California.	W. Letts Oliver.	309 Montgomery st.	10.	Apr 28
Standard Con. M. Co.	California.	Win Willis.	309 Montgomery st.	25.	Mar 12
Syndicate M. Co.	California.	J. Stadfeld.	419 California at	10.	Apr 5

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAY 8.	WEEK ENDING MAY 15.	WEEK ENDING MAY 22.	WEEK ENDING MAY 29.
Albion.....	1.25	1.50	1.10	1.25
Alta.....	1.55	1.75	1.30	1.65
Argenta.....	.45	.20	.10	.35
Belcher.....	.70	1.15	1.15	1.00
Belding.....	.09	.15	.15	.15
Best & Belcher.....	1.75	1.75	1.70	2.50
Bodie Con.....	.50	.50	.50	.50
Bonanza King.....	.30	.35	.35	.70
Bodie Isle.....	.30	.35	.35	.70
Bodie Con.....	3.30	4.25	3.45	3.35
Benton.....	.30	.45	.35	.50
Bodie Con.....	.40	.60	.55	.55
California.....	.20	.25	.20	.15
Challenge.....	1.25	2.10	1.05	1.45
Champion.....	1.25	2.10	1.05	1.45
Confidence.....	1.10	1.20	1.10	1.25
Con. Imperial.....	.20	.30	.20	.25
Con. Virginia.....	.20	.30	.20	.25
Crown Point.....	1.25	1.40	1.25	1.40
Day.....	2.25	2.40	2.45	2.45
Eureka.....	4.00	4.00	3.20	4.00
Eureka Tunnel.....	.15	.30	.10	.15
Excelsior.....	.10	.25	.15	.05
Grand Prize.....	1.30	1.65	1.25	1.60
Gould & Curry.....	.10	.10	.10	.10
Goodrich.....	2.10	3.25	2.50	2.05
Hale & Norcross.....	2.40	2.40	2.35	2.40
Holmes.....	.25	.25	.25	.30
Independence.....	.20	.20	.25	.25
Julia.....	.20	.20	.25	.25
Justice.....	.60	1.10	.65	.85
Martin White.....	.50	1.10	.65	.85
McCon.....	1.20	1.40	1.00	1.50
Mexican.....	.20	.25	.25	.25
Mt. Diablo.....	.20	.25	.25	.25
Northern Belle.....	.20	.25	.25	.25
Navajo.....	.20	.25	.25	.25
North Belle Isle.....	.20	.25	.25	.25
Occidental.....	.50	1.45	1.25	1.55
Overman.....	.55	.85	.50	.65
Potosi.....	.55	.85	.50	.65
Pinal Con.....	.40	.85	.70	.65
Savage.....	1.70	2.35	1.90	1.60
Seg. Belcher.....	.50	.50	.50	.50
Sierra Nevada.....	.25	.30	.25	.30
Silver Hill.....	.30	.35	.35	.35
Silver King.....	.25	.30	.25	.30
Scorpion.....	.30	.35	.35	.35
Syndicate.....	.30	.35	.35	.35
Union Con.....	1.35	2.40	1.70	2.15
Utah.....	1.40	1.75	1.30	1.45
Yellow Jacket.....	1.35	2.10	1.85	2.02

Sales at San Francisco Stock Exchange

THURSDAY A. M., May 29.	120 R. & Belcher.....	1.85
740 Alta.....	1.80	8
90 Bodie Con.....	4.0	80
225 Benton.....	.45	10
400 Belle Isle.....	.50	55
375 Con. Virginia.....	.15	20
500 California.....	.20	23
125 Crown Point.....	1.35	31
70 California.....	.15	50
359 Day.....	1.7	40
340 Excelsior.....	.05	10
260 Gould & Curry.....	1.2	105
330 Hale & Norcross.....	2.10	2
420 Mexican.....	1.6	75
100 Mono.....	.75	325
300 N. Belle Is.....	.25	200
150 Navajo.....	.10	160
200 Ophir.....	1.07	10
150 Sierra Nevada.....	1.05	11
100 Silver King.....	.5	90
30 Syndicate.....	.50	335
20 Utah.....	1.30	75
70 Union Con.....	1.30	50
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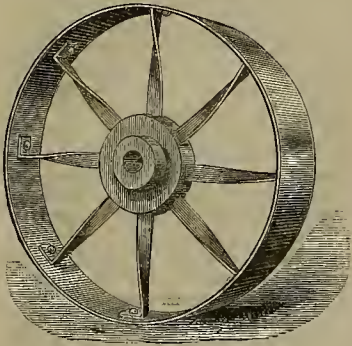
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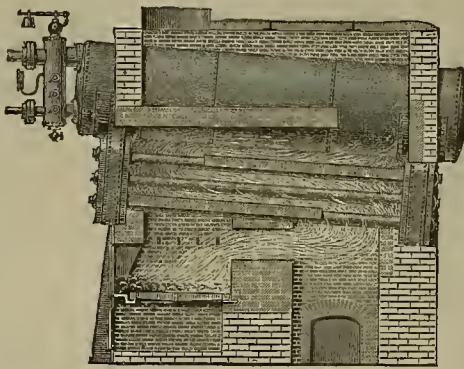
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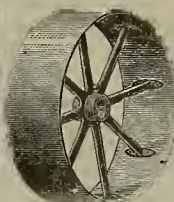
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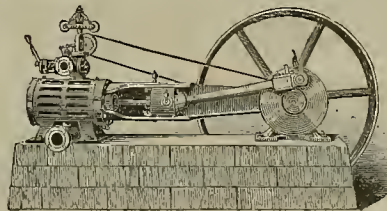
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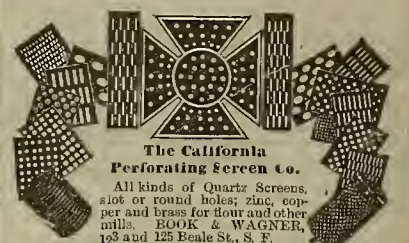


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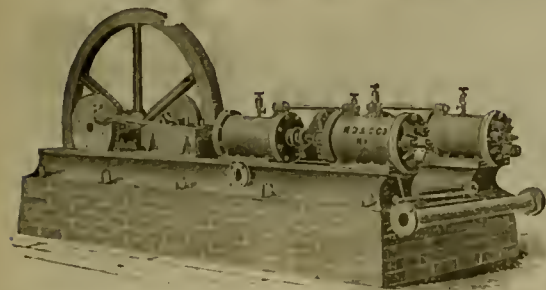
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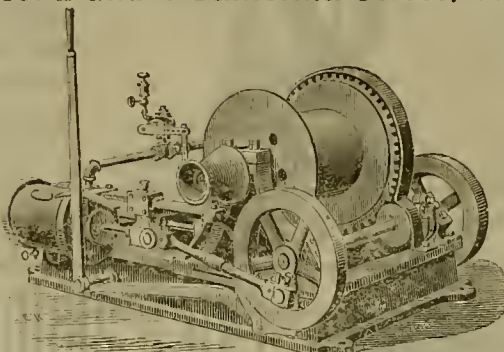
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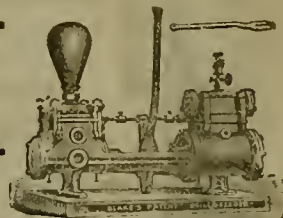
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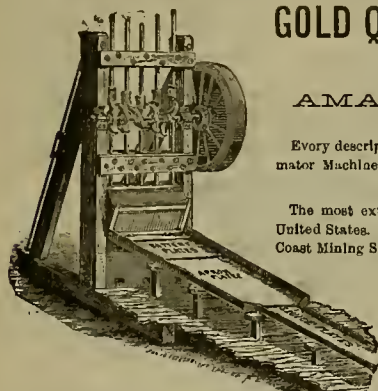
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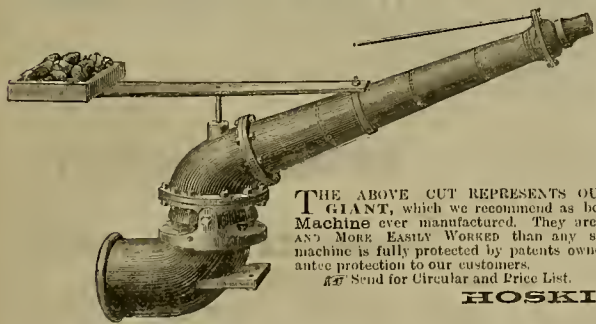
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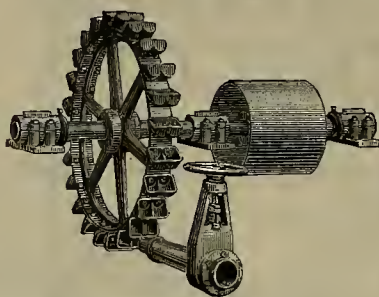
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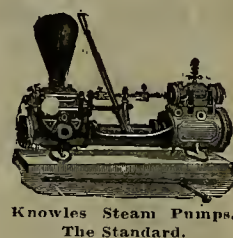
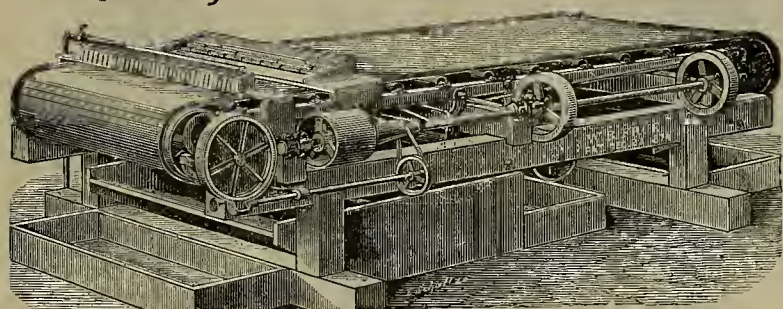
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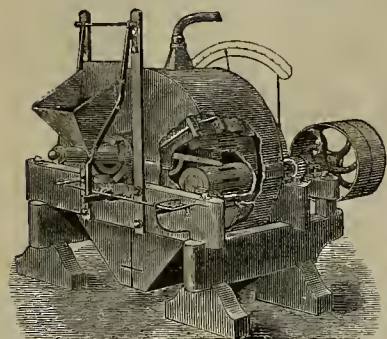
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SAN FRANCISCO, SATURDAY, JUNE 7, 1884.

VOLUME XLVIII
Number 23.

Foreign Patents.

The number of years in which patents are granted varies in different countries, and in nearly all are affected by conditions, the fulfillment or non-fulfillment of which cannot possibly be known to our own Patent Office, notwithstanding which fact inventions patented abroad are only patentable in this country for terms concurrent with the value and duration of the foreign patent. Much confusion naturally arises out of this condition of things, but its most serious effect is felt by innocent purchasers of patents which have lapsed or may lapse with the termination of a foreign right of which they have no knowledge. The Commissioner of the Patent Office of the United States has suggested proper legislation to fix a definite term for patents upon articles or devices that have first been patented in foreign countries; and considering the fact that the terms for which patents may be granted in foreign countries are shorter than those for which they may be originally granted in this country, he suggests that 12 years would be a proper term for patents when the invention has first been patented, or a patent applied for, in a foreign country. The difficulty now experienced in Patent Office practice would be thus removed, and a necessary certainty obtained. Many of our inventors do not seem to have a true appreciation of the value of foreign patents, and content themselves with protecting their inventions in this country alone. The European countries are very densely populated, and there are hundreds of our United States patents which, if known there, would bring large returns to the owners. People who have made successes of their inventions in America should consider the fact that a few hundred dollars expended in obtaining foreign patents may bring them in much more than they get in this country. As a general proposition, when a man patents in this country a good practical invention it will pay him to select two or three foreign countries and procure patents in them also. The MINING AND SCIENTIFIC PRESS Patent Agency is prepared to give all the necessary information and to procure patents in all countries in the world. England is generally selected first, on account of its large centers of population and the opportunities for quick sale of the patent right or the article itself. Germany, too, is a good place for American patents. The Australian Colonies are quite often selected by Pacific Coast people because of our trade with those regions. It depends, of course, on

the nature of the invention as to the best countries in which to obtain the patent. We shall be pleased at any time to give information as to the cost, requirements, etc., of the different countries of the globe where American inventors care to patent their inventions.

Academy of Sciences.

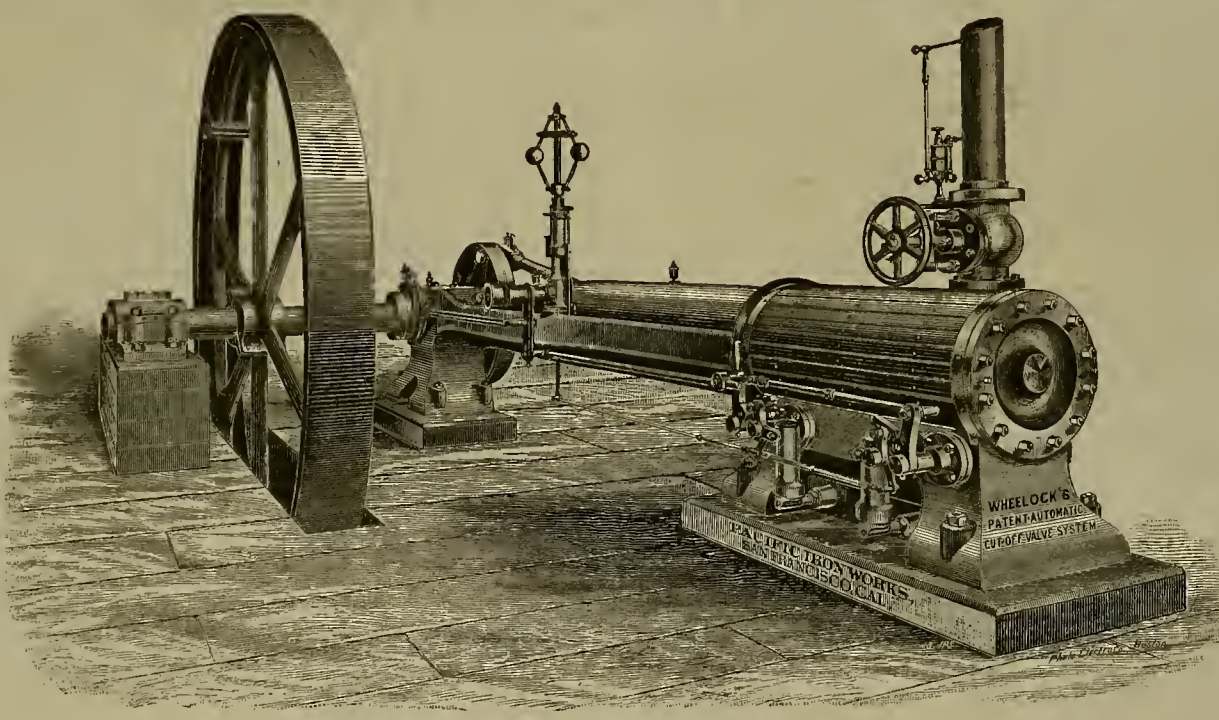
Professor Davidson has been suddenly called to Washington. Vice-President Harkness presided at the meeting of the Academy of Sciences on Monday evening last. Richard H. Sinton was proposed as a resident member, and A.

The Wheelock Engine.

The Wheelock Engine, illustrated on this page, is the type which took the grand prize at the Paris Exposition and also first prize at the Millers' Exposition in Cincinnati, where severe practical tests were made. The elaborate valve-gearing, characteristic of most variable cut-off engines, has been simplified in the Wheelock so as to obviate this objection. The engine has many qualities to recommend it to the mining and manufacturing interest on this coast. Among these are its simplicity of construction and perfect automatic action. No special

with the determined yet adjustable point of expansion, combine to produce economical effects. The cylinder has but two ports, steam being admitted and exhausted by a single valve. The steam chest and valves are located beneath the cylinder, which prevents any trouble from water. All adjustments, both of the main and cut-off valves, are made on the outside of the steam chest, and are therefore accessible for repairs when necessary. The patent steam piston packing is a prominent and valuable feature of this engine, by which the friction and wear of the cylinder is materially reduced and the adjustment so perfect as to prevent absolute-

ly all loss of steam. Syphon condensers can be attached where water is accessible, with a saving of fully 30 per cent. The high rate of piston speed at which these engines can be run makes the duty of any given size relatively high, thus making a saving in first cost as well as in transportation and erection. The proportions are also much heavier than Eastern made engines, while the general design and detail of construction are in accordance with the most advanced practice, and adapted to the kind of duty demanded on the Pacific coast. Among the many engines of this type sent out by Rankin, Brayton & Co., of the Pacific Iron Works, of this city, are those at



THE WHEELOCK AUTOMATIC CUT-OFF ENGINE.

Pierce as a life member. A paper on "A Mechanical Test for Coal" was read by Melville Attwood, extracts from which appear in another column.

Prof. A. M. Bell, of Washington, inventor of the Bell telephone, explained his invention, which he called visible speech. It consists of signs representing sounds, the signs indicating the position in which the tongue and lips must be placed to make the sounds. The speaker stated, as an illustration of the accuracy with which the signs could be read and translated into sound, that if anyone were to speak a word in the Indian language, or any other language foreign to him, he, or any expert could write the word by the signs, so that another expert, who had never heard or seen the word could instantly speak it.

General Houghton said that Prof. Bell's system was being tried in the Berkeley Institute for the Deaf and Dumb.

Dr. H. Hernau Behr showed a phylloxera insect in the gall on a grapevine leaf, seen through a common magnifying glass, the first of the kind ever exhibited in the Academy.

THERE are between twenty-five and thirty logging camps in operation on the Skagit river and its tributaries in Washington Territory.

mechanical skill is necessary to run them, as they are run with an open throttle and under all conditions of load or pressure, are completely under the control of the governor. They are also provided with an automatic stop-motion, so that in case of derangement to the governor or attachments, the engine is immediately brought to a standstill.

Regarding economy of working, exhaustive and thorough tests have been made in various places during the past few years with satisfactory results. The special claims made for this engine, simplicity of construction, durability and economy of operation, are elaborated more fully in the following details:

The valves do not rest on their seats, but are partially suspended on hardened steel trunnions, and are therefore free from friction and handled without resistance, the effect being the same as steam balancing, without the objections that apply to that method. They are also tapered and self-adjusting to compensate for wear, and by an ingenious arrangement of the journals and bearings are made self-packing and thus require no stuffing boxes. The clearance is reduced to a minimum by the use of but one port at each end of the cylinder.

The positive movement of the main valves and the quick motion of the cut-off valves, together

work in the following places: Yosemite Flour Mills, Bay City Manufacturing Co. and Detrick Bag Factory, San Francisco; Judson Manufacturing Co. and Oakland Hosiery Co., Oakland; Crown Mills, Stockton Agricultural Works and Buell Planing Mills, Stockton; Hollister Flour Mills, Hollister; San Jose Flour Mills, San Jose; Chico Flour Mills, Chico; and Portland Milling Co., Portland, Oregon.

At the last meeting of the Geographical Society it was ordered that the report of the Committee on Shoaling of the Bay be taken from the file and the lecture of Professor Davidson added, and the whole be adopted as the sense of the association. J. Finlay Finlayson read an interesting paper on "British Guiana—Its Past, Present and Future."

The town of Murray at the Coeur d'Alene mines bids fair to be the leading one in that section. The newspaper has been moved from Eagle to Murray, which town is in the center of the producing mines.

RICHARD H. SAVAGE has retired from the firm of Savage & Sons, and a new partnership has been formed under the name of Savage, Son & Co., consisting of Richard and John Ewart Savage and George Monroe Pinckard.

Some Researches on the Amalgamation of Gold and Silver.

The following paper was read before the American Institute of Mining Engineers, by T. Eggleston, Ph. D., N. Y.:

In the year 1881 I presented to the Institute two papers containing the results of researches on gold, in which I endeavored to make plain some of the causes of the losses in the working of gold ores. Since that time I have continued this investigation at intervals with the following results.

In the papers previously presented to the Institute I made no attempt, to make compounds containing more than two substances. Since then I have endeavored to make more complex compounds. The experiments consist in fusing mispickel free from gold with a certain amount of metallic gold, and experimenting with that; also fusing the same mineral with sulphide of antimony, and fusing iron pyrites with gold and compounds of antimony.

The mixture was made with mispickel taken from a vein not far from Stamford, Conn., absolutely free from gold. It was fused with gold in a crucible, reduced to powder, carefully roasted, sampled and assayed, and found to contain 143 ounces of gold to the ton. This mixture was then amalgamated in an iron vessel, without chemicals, with clean mercury, and by this method 36 ounces, or 25 per cent, were extracted, and 107 ounces were left in the tails. It was then amalgamated with a neutral solution of bichloride of mercury in an iron vessel, and 11 ounces, or 7.5 per cent, were extracted, and 132 retained in the tails, making a total of 32.5 per cent extracted.

Another sample was treated with mercury and an acid solution of bichloride of mercury in an iron vessel, and 13 ounces or 9 per cent, were extracted and 130 left in the tails, the acidity of the solution having produced no effect. An electric current was then passed through a sulphuric acid solution with mercury; 23 ounces, or 16 per cent, were extracted and 120 left in the tails, or 25 per cent altogether extracted.

A fresh sample was then treated with cyanide of potassium and mercury in an iron vessel, and 62 ounces, or 43.3 per cent, were extracted while 81 ounces were left in the tails. These tails were then re-amalgamated with cyanide of potassium; two ounces were extracted and 79 left in the tails. These tails were again re-amalgamated with salt, bichloride of mercury, and mercury, and two ounces, or in all 46 per cent were extracted and 77 ounces were left in the tails.

After Repeating These Experiments

A number of times the conclusion was drawn that on artificially prepared substances such as these, made by fusion, the most careful and prolonged roasting did not sufficiently destroy the combinations of gold, or more probably the coating of oxide of iron on the gold, so as to enable the mercury to reach it even when bichloride of mercury was added with a neutral solution and no advantage was gained by treating such an ore with bichloride of mercury, even in an acid solution; and that even with cyanide of potassium, which acted the most powerfully of all the chemicals, the amount of loss would necessarily be very large, and that it is consequently dangerous in roasting ores of gold containing sulphur and arsenic ever to allow a high temperature in the furnace. The amount of sulphur contained in the roasted ore was not determined chemically, but it was quite small, and so was also the amount of arsenic. The roasting was prolonged and very carefully done, every precaution being taken to prevent such an elevation of the temperature as would cause the ore to frit, and every effort was made to have the processes conducted exactly as they would have been in a mill.

Sulphide of antimony, free from gangue, was then mixed with the pulverized arsenopyrite, and fine sponge gold added to it, and the whole fused in a crucible. It was then pulverized, roasted and assayed, showing \$516.72 to the ton. It was then treated in an iron vessel with cyanide of potassium and mercury. The tails assayed \$69.27, showing that 88 per cent of the gold had been extracted.

Another sample of the same ingredients was melted in a crucible, and assayed 249.5 ounces to the ton after amalgamation. The tails contained 57.7 ounces, showing that only 76.9 per cent of the gold had been extracted.

Pulverized iron pyrites, stibnite and gold were then fused together, carefully roasted and assayed 56 ounces to the ton. The roasted ore was then amalgamated with cyanide of potassium in an iron vessel, and 9.1 ounces were extracted. The tails were then amalgamated with bichloride of mercury and mercury in an iron vessel, and 4.8 ounces extracted, or 13.9 ounces altogether, showing an extraction of only 24.82 per cent. As a microscopic examination showed a very few exceedingly small spots of undecomposed pyrites, it was thought best to repeat the experiment. Another mixture was made, which, after roasting, assayed 120 ounces to the ton. The roasting was done with the greatest care at a low temperature. After the fumes ceased to be given off, powdered charcoal was added to reduce any oxidized compounds. The excess of charcoal was burned out at as low a temperature as possible. Only 25.36 ounces were ex-

tracted, or 21.14 per cent, thus confirming the previous experiment. Up to this time I had never been able to obtain from any of the mines a

Mispickel Containing Gold.

Since the Troy meeting of the Institute, I have, through the kindness of Messrs. Rothwell and Platt, obtained some. The raw ore contained 14.17 per cent of sulphur, and 20.50 per cent of arsenic. The roasted ore contained 0.67 per cent of sulphur and 1.87 per cent of arsenic. The assay of the roasted ore showed it to contain \$67.88 per ton in gold, and \$5.17 in silver. On treating it with cyanide of potassium and mercury in an iron vessel the tails were found to contain \$14.16 of gold and \$3.67 silver, so that 75 per cent of the gold, and only 30 per cent of the silver was obtained by this process. This treatment of the roasted ore was much more successful than with the material which had been fused, and shows the necessity of avoiding high temperatures in roasting gold ores. It is evident that without the

Use of Expensive Chemicals.

under conditions artificially produced there is something which prevents the amalgamation when arsenic, antimony, and sulphur are together in the ore. Exactly what this is I have not yet been able to ascertain, but hope at some future time to be able to announce to the Institute exactly what the conditions are, which when sulphur, antimony, and arsenic are present, prevent the gold from being attacked by the mercury; but I have little doubt that it is for the most part a coating formed during the roasting, and that the imperfection of the trials is owing to the same cause, and to the very small quantities necessarily used in the laboratory tests.

As in the Konoake meeting of the Institute doubt was thrown on the experiments on the non-amalgamation of hardened gold, I have renewed them with great care. A neutral solution of corrosive sublimate will scarcely attack gold at all under any conditions whether hard or soft. I have repeatedly tried the experiment of placing the pieces of gold in a neutral solution and touching them with a point of iron, such as a knife blade. The blade of the knife became invariably corroded, and amalgamation sometimes took place at the point where the iron touched the gold, but spread no further even after prolonged contact with the iron. When this same soft gold was placed in an acid solution and touched with an iron point, the amalgamation took place instantaneously. When, however, the gold which has been hardened by heating on an anvil, is subjected to even the acid solution, it amalgamates very slowly, even with prolonged contact with the salt of mercury. Through the kindness of Tiffany & Co. I obtained

Samples of Pure Gold

And of gold alloyed with copper. These samples were first rolled until they were extremely hard and then were hammered on an anvil and were placed in contact with mercury. After a considerable time they began to amalgamate very slowly. Samples of the same gold were then annealed in an ordinary Bunsen flame, after which annealing they became perfectly black and would not amalgamate at all under any conditions, owing to the formation of an oxide of copper upon the surface of the metal which prevented contact. When, however, the original alloy and also the alloy annealed was treated in nitric acid they both amalgamated with equal readiness. It appears therefore that not only will fine gold which is hammered be prevented from amalgamation, but that the ordinary alloys of gold will also be prevented equally from amalgamation. When fine gold, as I stated in my previous researches, is hammered, it does not amalgamate; but when it is annealed, it will immediately amalgamate. This appears not to be the case with all alloys, where there is an opportunity in the course of annealing for an oxide to be formed. In order to reproduce the

Conditions in Which Metallic Gold is Found

in the stamp mills, strips and pieces of gold were pounded in a perfectly clean iron mortar with a clean pestle in as nearly as possible the same conditions as they would be in an ordinary stamp mill. It was found that when the stamping was done under water and with light blows, and for only a short time while there was an evident increase in the difficulty of amalgamating, the gold did amalgamate with sufficient readiness to insure that the most of it would be caught by the mercury after prolonged contact. When, however, the blows were very heavy and the pounding continued for some time so as to flatten out the piece, prolonged contact with the mercury produced only a very slight amalgamation, which did not even show the smallest trace under five minutes, and was only partial even after half an hour. Every attempt was made to make the mercury attack this gold. It was placed directly in and on it, but the quicksilver rolled over and over as if the gold had been so much sheet iron. Even when the mercury commenced to adhere to the gold it was in very minute spots which did not spread for a long time. When a piece of the same metal was treated with acid, there was a perceptible difference in the rate of amalgamation; but it was still very slow, too slow for the amalgamation of an ordinary stamp mill. When these same pieces were annealed

they amalgamated immediately. The same operation was repeated on pieces pounded in a mortar without water. The amalgamation took place even more slowly than before. When the pieces were cleaned with acid they amalgamated about as slowly as the pieces treated under water which had not been cleaned. It took a much longer time to produce the adherence of the fine globules of mercury, and they propagated themselves much more slowly. In every case where a freshly broken edge came in contact with the mercury it was attacked at once, showing that a film had been formed which prevented contact. This film is slowly dissolved by acids and quickly dissipated by heat, for when they were annealed the pieces amalgamated at once. The same results were obtained when the gold was heated on a dusty anvil. The same experiments were

Tried with Silver.

Pieces, obtained from an assay, which were consequently nearly pure, were pounded in a mortar, some with, others without water. Those in which the water was used presented a perfectly clean appearance, somewhat duller than the ordinary color of silver, and when made into a small dish and a globule of mercury placed upon it, it retained the mercury for a considerable length of time without being affected by it at all. When the mercury was placed in a vessel, and the silver dipped in it, it did not attack it all at first, but after considerable agitation and rubbing against the sides of the vessel an attachment was made on the edge. When this edge was broken the mercury attacked the fracture at once, very fine globules being disseminated all over the edge. Notwithstanding this the surface resisted the contact of the mercury for a considerable length of time, and then was only irregularly attacked. When the piece was treated in diluted sulphuric acid for some time, and then cleaned and treated with mercury, it resisted in the same way, but for a shorter time. When this piece so cleaned was annealed in a Bunsen burner, the mercury attacked it instantly.

The pieces which had been pounded in the mortar without water had a much darker appearance in patches unevenly distributed over the surface of the piece. It resisted the action of the mercury for a great length of time, but when placed in a vessel with the mercury and treated with sulphuric acid, it acted in about the same way as the piece pounded under water did before being cleaned. It would have taken a very long time to have amalgamated the whole of this piece. When the cleaned pieces was, however, annealed and placed in the mercury it amalgamated like all the others instantly. It thus appears that silver as well as gold is

Affected by Pounding.

And that under the most favorable conditions, where no foreign material is present, it will amalgamate with very great difficulty. When, however, any foreign material, as dust or small particles of ore had been allowed to remain in the mortar or on the pestle, the amalgamation took place even more slowly than before, and in some cases after a number of hours, no perceptible effect of the mercury could be observed. That this coating is a superficial one, that amalgamation is possible where there is a freshly broken edge, and that this amalgamation on the edge will eventually extend through the whole piece, and that the pounding of the pieces is undoubtedly a source of loss in the mills, these experiments seem to settle decisively.

It is well known to silversmiths that when silver is annealed after being hardened it turns black, and that when this is placed in the pickling acid the black substance is dissolved upon the surface and it becomes perfectly white. When, however, this white coating is brushed into, there appears below it a purple coating which is composed of the oxides of copper and of silver, and this purple coating cannot be removed except at considerable expense. A microscopic examination of the coating shows that when the pickling acid attacks the coating of oxides, it does so only superficially, leaving a porous coating, which when highly magnified shows the oxide below. As the oxides are lodged in the bottom of the lines of the scratches which are produced by the polishing, the decomposition of the light gives appearance of a purple color. When, however, the objects are highly magnified, only the white color of the pure silver and the brown in the bottom of the depressions of the scratches are seen. It seems probable that similar oxides form upon gold alloys and prevent the contact of the mercury.

Discussion.

R. P. Rothwell, New York City: I have been treating arsenical pyrites for some time. I have made a good many tests, covering perhaps a thousand or fifteen hundred tons of mispickel ores, treating by amalgamation in pans, and I do not find the difficulty that Dr. Eggleston has suggested in roasted ores. On the contrary, I was able to get over eighty, up even to eighty six per cent of the gold from roasted mispickel. If Dr. Eggleston had confined his remarks to raw mispickel, I think he would have expressed about what I found to be true in treating the raw ores by amalgamation, but in the roasted ores you can get out a very large percentage.

The percentage that can be amalgamated in raw mispickel will probably not exceed 30 to

40. The reason for this, I am not able to state; but Mr. Riotte of Mathey & Riotte, of New York, who tested some of our mispickel ores, told me that he had examined it with a microscope, and that the gold in it was what you would call coarse gold, though to the naked eye the gold seemed pretty fine, yet under the glass it was comparatively coarse gold. As far as he could see with the microscope, it stopped suddenly at a certain line and beyond that he found no fine gold. Even though he pulverized it very finely in a mortar, he could find no more free gold in it. He then assayed this remaining mispickel that had not apparently any gold in it, and he found, as he told me, very uniformly about \$20 per ton in it, that was in the condition of what he called "combined gold." I do not know whether that is the reason that it did not amalgamate, but I know that the arsenic has something to do with it, and that this is very injurious in amalgamation by reason of flouring the quicksilver; but when you roast these ores, even though you are unable to get out all the arsenic, there is no difficulty whatever in getting at least as perfect an amalgamation as you do from free gold-ores generally. When we extracted that percentage, the roast was made in a revolving cylinder, 24 feet long, and it was not so perfect a roast as is necessary for chlorination, and yet we got that high percentage. When the ores are thoroughly roasted, although they still contain some arsenic, which you find in solution after chlorination, they will amalgamate up to a very high percentage. The average of the first eight hundred tons that I treated by chlorination gave about ninety-four and a half per cent, and it ran up to ninety-eight and even ninety-nine per cent, fire assay, that we would get out by leaching the chlorinated ore. But chlorination requires a more perfect roast than amalgamation. I see, nothing, therefore, in the arsenic that interferes with chlorination, nor with amalgamation, if you roast the ores well; though you never get rid, as I say, of all the arsenic, which you find again in the solution, where it produces new complications, which the professor has not referred to and which it is not necessary to mention.

NEW MEXICAN MINES.—Things look a little gloomy in the east and not very flattering accounts come from Arizona, but a brighter outlook for the mining industry has never dawned upon Grant county. With improved machinery for the treatment of our low grade ores this section of Grant cannot but come to the front. When miners have ready sale for their product they will set to work upon their properties with a vim. Hundreds of claims upon the dumps of which ore has been lying for years past will be operated under the new order of things, and the thump of the hammer and echo of the blast will be familiar sounds. The attention of the mining men from abroad is being attracted by the flattering returns from some of the mines at present in operation, and daily, men who are desirous of investing are coming among us. It is true that the outrageously high prices asked for many of the claims offered for sale tend to drive many capitalists out of the country. The experience derived the past year will work to the advantage of the prospectors of this country, in convincing them that they cannot dispose of their prospects at fabulously high prices unless great merit can be shown. Fair prospects are numerous and prospectors, with the advantages offered by local reduction and sampling works, can find ready sale for their ore in small or large quantities, thereby developing their claims at small cost, if not to a profit, and placing them in a condition to invite capital. The sooner an owner discovers a claim to be worthless, the better for him.—*Silver City Enterprise.*

THE SWEETWATER MINES.—L. J. Hill, H. E. Wright, Jas. F. Norman, Wm. Shirley and John Poor returned on Monday from a visit to the Sweetwater mines. Mr. Shirley, a prominent millman of Dayton, Nevada, and formerly superintendent of the Bodie Tunnel mill, went to examine the Kentuck mine, while Messrs. Hill, Wright and Norman paid a visit to their leading mine, the Silverado. This mine is employing a force of nine men, under the superintendence of Thomas Downing, and is showing up some very fine ore. The mill, now in process of construction to run on ore from the Silverado, will be ready for operation by early July. The mine is being rapidly put in shape for taking out ore. It is attracting considerable attention, and bids fair to become one of the leading mines of the district. The men employed in the Kentuck on percentage are doing well, and are taking out some really fine ore. The mill will start soon, either on tailings or on ore from the mine. Several other mines in the district are working men, and others only await the disappearance of snow from the mountains to resume operations. The opinion is very prevalent in Clinton that the Kentuck mine is not yet even prospected, and all are hopeful for a prosperous season.—*Bodie Free Press.*

THE ARANTRA BUSINESS.—Below the Green Mountain mill the Italians have thirteen large water aras, which work steadily day and night on the mill tailings. For these they pay the company a certain sum per ton, and what they make is known only to themselves, but that they make the tailings pay something is certain, or they would not continue the business.—*Cor. Plumas National.*

MECHANICAL PROGRESS.

Uses of Aluminum.

Aluminum bids fair at no very distant time in the future to prove a metal of considerable importance in the arts. Just now its high price is a bar to any very extensive introduction of this metal into general use. Chief Engineer Latimer, of the New York, Pennsylvania and Ohio road, in a paper recently read before the Civil Engineers' Club at Buffalo, said that the time might not be far distant when rails of aluminum would take the place of steel, as, according to a recent report, it had been announced that aluminum could be produced for about the same figure that steel rails formerly cost. One writer claims that this metal can now be produced at twenty cents a pound. It has doubtless the strength of iron, but its chief excellence is its non-corrosive properties. The rails of the present rust out almost as rapidly as they wear out. Indeed, if aluminum can be produced at the figure above stated, there is no reason why it cannot be used in plating the iron work of bridges, which thus treated would look like massive works of silver.

For electrical use, as wire, Prof. Jamaisson, at a recent meeting of the Philosophical Society at Glasgow, Scotland, said he had found that the aluminum had 1.96 times the resistance of the copper wire of the same gauge and length, and but little more than half the resistance of pure copper for the same length and weight. The conclusion arrived at, therefore, was that aluminum had by far the least resistance of any known metal for its weight.

In the course of his investigation he had elicited a very curious fact, namely, that the introduction of a very small percentage of aluminum into copper not only raised its tensile strength immensely (the specimens shown having a breaking stress of about 45 tons per square inch), but also enormously increased its resistance. So far as his tests had gone, the specimens shown had a resistance of 25 times that of pure copper. He pointed out the probable uses of such wire, as, for example, in the construction of high resistance coils. Other qualities might be found well adapted for telephone wires, and the purer kinds of aluminum, owing to the great lightness of the metal, could be used for military purposes, in which lightness of baggage is an important desideratum.

A NEW ALLOY.—Notwithstanding the perfection to which various metallic alloys have been brought, says London *Iron*, some of them develop defects when applied to certain purposes which it has been sought to remedy in others, but not always successfully, or if so, probably with the development of a defect of a different character. Long familiarity with the casting and working of metals and their alloys, more especially as regards German silver, led Messrs. Henry Wiggin & Co., of Birmingham, to turn their attention to this subject, and they have succeeded in producing a new metal which they have registered and named Silveroid. This is a white metal, in the production of which cadmium, one of the rarer metals, little known in the arts, is employed. Beyond this, however, there is a special method of treatment at a certain point in the manufacture which is the secret of success. The result is a metal of great whiteness, brilliancy, closeness of grain and tensile strength, as some samples by us show. This alloy is designed to suit every purpose and process of metallurgy, and has the additional recommendation of being offered at a price which is very low when compared with its merits, and which, other things being equal, will bring it rapidly into good demand. This new alloy is not specially recommended for the manufacture of light goods of the electro-plate class. It is mainly intended to take the place of alloys of the brass, bronze and gun-metal classes, in fact, of every inferior metal, where color, polish, weight and richness of luster are desirable. We learn that it is already being employed for railway carriage fittings, steamship furniture, harness mountings and carriage ornaments, for which, and other cognate purposes, it appears to be admirably suited.

IS PUDDLING NECESSARY.—A comparatively new process in the manufacture of low carbon Bessemer steel, says an exchange, was tried a short time ago at the works of the Pittsburgh Bessemer Steel Co., which, if after sufficient trial, is found successful, will completely revolutionize the work of puddling, doing away with that process altogether. Heretofore but little Bessemer steel has been made below a certain degree of carbon, which renders it impracticable to use for many purposes for which wrought iron is employed. But my late experiments under the present management, by the above works, steel is expected to be made as low in carbon as 1.600th of 1 per cent, which, the superintendent states, will answer all the purposes for which wrought iron is used.

TESTING STEEL RIVETS.—The following are the latest instructions issued by the British Admiralty for testing steel rivets: The rivets are to be made from steel bars having an ultimate tensile strength of not less than 58,000 pounds per square inch of section, nor more than 67,000 pounds, with a minimum elongation of not less than 20 per cent in a length of eight inches. A portion of one bar in every fifty to be taken for testing before being made into rivets. Pieces cut from every bar, heated uniformly to a low cherry red, cooled in water at 82° F., must

stand bending in a press to a curve of which the inner radius is equal to the radius of the bar tested. Rivets are to be properly heated in making, and the finished rivets to be allowed to cool gradually. The rivets are to stand the following forge tests: (1) The shank to be bent double cold, without fracture, to a radius equal to the radius of the shank. (2) Bent double hot, to as small a radius as possible. (3) Flattening of the rivet-head while hot, without cracking at the edges—the head to be flattened until the diameter is 2½ times the diameter of the rivet shank. (4) The shank of the rivet to be nicked on one side, and bent over to show the quality of the material.

STEEL CASKS.—A Wolverhampton (Eng.) firm has turned its attention to the manufacture of casks and barrels of steel. The two edges of the sheet of steel which form the cask are brazed together in such a manner as to justify the title of "seamless," which the patentees have applied to these productions. The head of the barrel is also riveted to the body, so as to leave no seam, and the end rims are shrunk on hot, thus making a very solid end, whilst, at the same time, the rims are thick enough to give a good purchase to the grappling-hooks of boats and cranes for loading and unloading purposes. The hush for the tap does not project beyond the rim, so that the nozzle is not liable to be knocked about and injured. The casks are more durable than wood, less bulky and lighter—on 18 gallon steel cask weighing some 10 pounds less—a not unimportant consideration as regards transit. In point of shape, a steel barrel is exactly that of a well-formed wooden one, the bulge of the belly allowing of its being easily rolled along, and better managed by one man than drums can be by two.

THE ANCIENTS.—Nothing could better illustrate the complete ignorance of the ancients as to the true nature of steam, the pressure of the atmosphere and the significance of a vacuum, than this simple toy, the notion of which any schoolboy of to-day can explain. It was a favorite subject for contemplation and wonder to the philosophers of the period. They never tired of watching it and framing elaborate and pompous explanations of its laws of action, which, stripped of verbiage, simply amounted to saying that it worked because such was the nature of things it couldn't help it. Of the real rationale of the process involved they had not the slightest conception. The very existence of the air as a heavy superincumbent fluid, pressing upon everybody and everything with a force of 15 pounds on every square inch of surface, of steam and its laws, even the true idea of what constituted a vacuum, these were then mysteries which had to wait for Galileo and Torricelli to unravel.

A LONG STRAIGHT EDGE.—An absolutely exact straight edge of more than thirty-six inches is a wonder of mechanism. One of six feet was not recently believed possible, although several had been made on different plans of web-like and truss construction. It has been claimed, however, that almost exactness has been secured by a straight edge twelve feet long. The appliance looks like an arched truss, the highest spring of the arch being only twenty inches in a length of twelve feet. The space between the cord and spring is filled with diagonal lattice work. Three of these straight edges have been made, one remaining in the establishment where built, and two going to technical colleges. Each of them has been tested by each other, and proved to be practically perfect. —*Scientific American*.

FRICTION.—Professor Thurston states that the coefficients of friction of lubricated surfaces under pressure, as given in text books, are much too high. Instead of four to seven per cent, as stated therein, he has obtained as low as one-fourth of one per cent with sperm oil. This, he says, is the best he ever found for heavy pressures, and he has made experiments all the way from very light up to 1,500 pounds per inch of surface. The crank pins of beam engines on steamboats, where a thousand pounds pressure to the square inch is not uncommon, run as low as one-half of one per cent for friction.

PROPORTION OF DEFECTIVE BOILERS.—A matter for serious consideration is the April report of the inspection of steam boilers at Hartford, Conn. The report gives 3,066 defective steam boilers out of 4,770 inspected, 491 of them being considered dangerous. The reckless manner in which boilers generally are used is really frightful, and the only wonder is that explosions and other accidents (!) are not more numerous than they are. It certainly is a compliment to boiler makers that the work they turn out hears so much abuse without breaking down or going up.

SOLAR HEAT MACHINES IN ALGERIA.—The French inventor who some time ago patented a machine for the use of concentrated solar rays as a general motive power has set up three of his machines in Algeria for the French government. He is now carrying on his experiments at the Island of Porquerolles, near Hyeres, in France, where he is thrashing Indian corn and raising water by the action of the sun's rays. It is not stated how much work he is able to accomplish though.

BETWEEN pure soft lead and glass hard crucible steel there are sixteen grades of hardness in tin, lead, copper, cast and wrought iron and steel.

SCIENTIFIC PROGRESS.

A Seven Thousand Mile Talk.

We have become quite familiar with reports of long talks over the telegraph wire by the use of the telephone, and of still much longer talks by means of the usual signals; but we have noticed a report of the latter character from the London *Telegraphist* which we believe exceeds anything of the kind heretofore accomplished. This long talk was accomplished between two persons 7,000 miles apart. This, to the uninitiated, will doubtless appear to be a marvel, and it is indeed a marvel—of science. Even to many a telegraph operator it may seem remarkable that direct communication can be effected over such an enormous distance. Nevertheless it is a fact, as testified by the editor of the *Telegraphist*, who gives his personal experience in an interesting article in his journal. He tells us that he had often heard of the wonderful line between this country and Teheran, the capital of Persia, a distance of 3,800 miles, but had scarcely realized the fact that good signals were obtainable through so great a length of wire until recently, when he availed himself of an invitation from the managing director of the Indo-European Telegraph Company, to make a visit of inspection. It was made on a Sunday evening, and he was first shown the Morse Printer in connection with the main line from London to Teheran. At starting, the editor was informed that he was through to Emden, and having asked a few questions of the operator in that German town he was put through to Odessa, and in a few minutes later to Teheran. Kurrachee was next spoken with, and afterwards he had a few minutes chat with Agra. To complete the telegraphic triumph, Agra switched the Old London Broad Street Station on to another line, and in a few minutes the editor was talking with a native operator at the Indian government cable station, Calcutta! At first the gentleman "at the other end of the wire" could not believe that he was really in direct communication with the English capital, and he exclaimed in Morse language: "Are you really London?" Truly this was a great achievement. Metallic communication without a break from old Broad street, London, to the telegraph office in Calcutta! 7,000 miles of wire! The signals were excellent, and the speed attained was about fourteen words per minute.

Dry Sulphuric Acid.

To make this corrosive liquid more portable and less risky in transportation it is proposed by the German chemists Vorster and Grunberg to add to it an absorbing material in the same manner as nitro-glycerine is mixed with absorbent earth. They have succeeded in carrying out the plan, and as the absorbent "kieselghur" (an infusorial earth chiefly consisting of silica), well dried and finely powdered.

It will absorb three times its own weight of sulphuric acid of 65 degrees B. In this condition it can be transported in lead lined vessels of iron or wood without any risk. For many purposes the powder may be used direct, but in some cases it must be removed by a washing of the powder, and it is asserted that "kieselghur" does not in any way contaminate sulphuric or the other mineral acids by dissolving, and that after the removal of the acid it may be dried and again used with perfect success. In this connection we may refer to the important fact that manufacturers of sulphuric acid are very generally realizing the advantages of manufacturing that product from pyrites instead of sulphur. This fact is shown from the statement that out of a total of about sixty acid works now in operation in the United States, nineteen of that number are now using pyrites, two more are almost ready to begin to burn it, and at least five have decided to erect the suitable plant. Of those now using it, one works is at Portland, Me.; one respectively at Everett, South Wilmington, North Weymouth, and New Bedford, Mass.; one at Bridgeport, Conn.; one in St. Lawrence County, and one at Hunter's Point, N. Y.; one at Bergen Point, one at Camden, and two at Elizabeth, N. Y.; one at Philadelphia, Pa.; one at Baltimore; two in South Carolina, at Beaufort and at Port Royal; one at Atlanta, Ga.; one in Chicago, and one in Detroit. The two additional works which are soon to commence burning pyrites are both in New Jersey. It is gratifying to note this rapid progress which promises to form the basis of a very large mining industry. Why should not the pyrites of California be thus utilized?

Science and Religion.

While the beliefs to which analytic science leads are such as do not destroy the object matter of religion, but simply transfigure it, science, under its concrete forms, enlarges the sphere for religious sentiment. From the very beginning the progress of knowledge has been accompanied by an increasing capacity for wonder. Among savages the lowest are the least surprised when shown remarkable products of civilized art, astonishing the traveler with their indifference. And so little of the marvelous do they perceive in the grandest phenomena of nature that any inquiries concerning them they regard as childish trifling. The contrast in mental attitude between the lowest human beings and the highest human beings around us is paralleled by the contrasts

among the grades of these higher human beings themselves. It is not the rustic, nor the artisan nor the trader who sees something more than a mere matter of course in the hatching of a chick, but it is the biologist, who, pushing to the uttermost his analysis of vital phenomenon, reaches his greatest perplexity when a speck of protoplasm under the microscope shows him life in its simplest form, and makes him feel that however he formulates its processes the actual play of forces remains unimaginable. Neither in the ordinary tourist, nor the deer stalker climbing the mountains above him, does a highland glen rouse ideas beyond those of sport or of the picturesque; but it may, and often does, in the geologist. He, observing that the glacier-bounded rock he sits on has lost by weathering but half an inch of its surface since a time far more remote than the beginnings of human civilization, and then, trying to conceive the slow denudation which has cut out the whole valley, has thoughts of time and power to which they are strangers—thoughts which, already utterly inadequate to their objects, he feels to be still more futile on noting the contorted beds of gneiss around, which tell him of a time, immeasurably more remote, when far beneath the earth's surface, they were in a half melted state, and again tell him of a time immensely exceeding this remoteness when their components were sand and mud on the shores of an ancient sea. Nor is it in the primitive peoples, who supposed that the heavens rested on the mountain tops any more than in the modern inheritors of their cosmogony who repeat that "the heavens declare the glory of God," that we find the largest conceptions of the universe or the greatest amount of wonder excited by contemplation of it. Rather it is in the astronomer who sees in the sun a mass so vast that even into one of his spots our earth might be plunged without touching its edges, and who by every finer telescope is shown an increased multitude of such suns, many of them far larger. —*Herbert Spencer, in Popular Science Monthly*.

ORIGIN OF PETROLEUM.—M. H. Byasson has been led by experiments to give, as a scientific explanation of the formation of petroleum, the following: "If a mixture of vapor of water, carbonic acid and sulphureted hydrogen be made to act upon iron, heated to a white heat in an iron tube, a certain quantity of liquid carburets will be formed. This mixture of carburets is comparable to petroleum. The formation of petroleum can thus be naturally explained by the action of chemical forces. The water of the sea penetrated into the cavities of the terrestrial crust, carrying with it numerous materials, and especially marine limestones. If the subterranean cavity permits these new products to penetrate to a depth where the temperature is sufficiently high, and to come in contact with metallic substances, such as iron or its sulphurets, we have a formation of carburets. These bodies will form part of the gases whose expansive force causes earthquakes, volcanic eruptions, etc. Petroleum is always found in the neighborhood of volcanic regions or along mountain chains. In general it will be modified in its properties by causes acting after its formation, such as partial distillation, etc. Petroleum deposits will always be accompanied by salt water or rock salt. Often, and especially where the deposit is among hard and compact rocks, it will be accompanied with gas, such as hydrogen, sulphureted hydrogen, carbonic acid, etc."

CHEMICALLY OR MECHANICALLY COMBINED.—Prof. Tyndall, in advocating his atomic theory, said that compound substances, such as brass and other alloys are held together by pressure, and could, therefore, be separated by force, and so the atoms are only mechanically combined. Not long ago says the *Cincinnati Artisan* in alluding to this matter, we read of the curious experience of a brass tubing manufacturer which demonstrated the correctness of the mechanical combination. An attempt to produce brass tubing by hydraulic pressure was made, when at a pressure of 4,000 tons on the brass block the copper and zinc separated, the latter forming the tube, leaving the copper behind.

A CURIOUS natural barometer is said to be used by the remnant of the Araucarian race which inhabit the southernmost province of Chili. It consists of the cast off shell of a crab, which, from its curious application, is called the "Barometro Araucano." The dead shell is said to be extremely sensitive to atmospheric changes, remaining quite white in fair (dry) weather, but indicating the approach of a moist atmosphere by the appearance of small red spots, which grow both in number and in size as the moisture in the air increases, until finally, with the actual occurrence of rain, the shell becomes entirely red, and remains so throughout the rainy season.

SCIENTIFIC INVENTIONS.—The inventor is rapidly reaching out into the domain of science in the exercise of his peculiar genius. He has already produced several mechanical devices to act as a substitute for thought and mental labor. The latest which has come under our notice is an instrument called a percentograph, which has been patented by S. J. Tucker, of Richmond, Va., and which is intended to be used for calculating the percentages and amounts of revenue due each road over which freight is shipped. It is claimed for the instrument that it will do the calculation in about one-fifth the time it requires by ordinary clerical work.

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Passing Events.

The attention of the country is just now riveted on the convention in session at Chicago, where the presidential candidate of one of the great parties will be nominated.

There is little news of moment from any of the great mining centers. The great influx of population to the camps in the northwest is naturally resulting in a scattering of prospectors throughout the mineral regions of Idaho and Montana. But those territories show more material advances this year than any other mining sections. Thousands of men have left the older regions for these new ones. Many who went too soon, or unprepared, have returned, and given the country a bad name. Others, however, who have gone, speak highly of the prospects. Of course, in the Cour d'Alene region, as was expected, there will be many disappointed ones who will cry out against the country. But the local papers speak of many discoveries which bid fair to result in rich returns.

COAL.—Dealers report a great falling off in the demand of late. The advent of summer accounts for some of this decline. The consumption for office and household purposes is 50 per cent less at this time of year than in the winter months. But even this does not account in full for the existing depression. Supplies of some coast descriptions are quite large.

SOME San Francisco men are about to begin boring for coal near Verdi, Nevada. They say they are prepared to spend \$40,000 in their search. About twenty years ago a good deal of digging was done at that place for coal, but nothing more was found than the small streak at and near the surface.

A MINERS' MEETING was held this week in Eagle City, Cour d'Alene, for the purpose of establishing a new code of mining laws, especially directed against those holding and not working their claims, and for the adjustment of disputes over claims by arbitration.

Mechanical Test for Coal.

Consumers of coal, whether for manufacturing purposes or domestic use may wish to be able to distinguish and judge correctly of the different classes of coal they are using, particularly if that information can be obtained without much trouble or expense. At the last meeting of the California Academy of Sciences Mr. Melville Attwood, described a simple test he has been using for years. The rough and ready but tolerably correct mode alluded to for determining the different varieties of coal is effected by the aid of a carefully prepared "streak plate," and the method is so simple and easy that the average school boy may make the test. We have one of the plates in the office of the MINING AND SCIENTIFIC PRESS and find it very convenient.

The "streak plate" to be used must be good hard porcelain, which can be obtained in this city of John Taylor & Co., the most convenient size being four inches long by two and one-half wide. As they cannot be purchased ready prepared, to adapt them for testing it is necessary to rub them with a fine emery file, using water with a little washing ammonia in it, till there results a very smooth, hard and even surface on the plate. Then procure good average samples of the coal, letters corresponding to which must be fastened with cement to near the edge of the plate, about five on each side, against which, mark or rub gently a piece of each sample on the plate, which can be easily done by using a piece of cardboard, having slots cut out of it, one inch long by one-quarter of an inch wide. All that is then necessary to roughly determine a sample of coal, is to carefully select a fresh piece, free from decomposition, earthy matter or fibrous "mineral charcoal," and rub it gently on the plate, and then compare it with the streak or marks of the known varieties, by which the character of the coal may be ascertained with tolerable accuracy. To better distinguish the color and lustre of the streak on the plate, it must be turned round in the hand, and the sides moved up and down, so that the rays of light may strike, or be thrown in different directions on the streak.

The different varieties of coal may be classed as follows: 1st class—anhydrous coal, color black, with tinge of brown—blackish brown—containing of permanent water less than 5 per cent, namely: anthracite, black, with luster and slight tinge of brown; bituminous coal, color blackish brown. 2d class—hydrous coal, color brownish, black brown and yellowish brown, containing from 5 to 15 per cent of permanent water, namely: brown coal, lignite, lightish brown, inferior lignite, yellowish brown.

Color of streak.

Graphite.....Black lead
Pumiliaginous anthracite.....Black, leadish black, little luster
Anthracite coal.....Black, with tinge of brown
Bituminous coal.....Brownish black
Brown coal.....Brownish black
Lignite.....Light brown
Inferior lignite.....Yellowish brown

Nearly all the superior varieties of coal are of a blackish color, and contain but a small amount of combined water, whilst the inferior are of a brown or brownish color and contain an excess of combined water.

For the determination of moisture, simple directions are given in "Attwood's Blowpipe Assaying."

"Select from the mass of coal to be examined a few lumps, representing as nearly as possible the average quality. Crush them up in the agate mortar into small pieces about the size of a mustard seed.

"Weigh out five grains, place in a small porcelain dish, and dry at a gentle heat over a spirit lamp. Hard coals sometimes fly when heated, so it is best to cover the dish with a watch-glass whilst heating. After about five minutes remove the assay and weigh; then repeat the heating and again weigh. As soon as they agree the assay is ready."

In Crooke's Metallurgy in the chapter on fuel is found "Examination of different kinds of coal." The nature of coal may frequently be judged of by its external appearance. A full black color, lively luster, and great bardness, indicate a large amount of oxygen, a pitch-like luster shows a small, and a glassy luster a somewhat larger amount of carbon. A black color, strong luster, slight coherence and little tenacity indicate the presence of a large amount of carbon, and also that the amount of hydrogen exceeds that of oxygen. Brownish black color, dull appearance, strong coherence and a certain

hardness indicate a small amount of carbon, whilst the amount of oxygen exceeds that of hydrogen.

Brown coal burns with an unpleasant empyreumatic odor.

The intention of the process of coking is:

1. To concentrate the carbon which the coal contains so that the coke may be capable of producing a higher temperature.

2. To remove the volatile substances which, on burning, especially when used for domestic purposes, have an unpleasant smell.

3. To deprive the coal of the property of becoming pasty at a high temperature in iron blast furnaces, for instance, in consequence of which the blast cannot penetrate sufficiently, and the process of the furnace becomes disordered.

4. To remove part of the sulphur which coal frequently contains in the form of sulphide of iron.

Good coal in coking loses about 30 per cent of its weight and gains that much in bulk.

Some of the inferior coals are valuable from the conditions of the ashes they contain. For instance, in domestic use, if the open grate is filled with some inferior coal, it does not all burn away like good coal would do, but leaves sufficient unconsumed material for some hours in the grate, by which the fire can be renewed without fresh kindling.

Notwithstanding the numerous reports to the contrary, we have not yet received any proof that fields of either good anthracite or good bituminous coal that would yield a good coke, have been found on this coast. The discovery of either kind so situated that the coal would be delivered at a cheap rate on San Francisco bay would supply a serious want.

Two Locations in One Application.

A very important decision has just been made by the Secretary of the Interior in overruling a decision of the Commissioner of the General Land Office. The Gold-Blossom quartz mine at Ophir, Placer county, was located in 1872, after the act of Congress was passed limiting quartz claims to 1,500 feet in length on and along the lode. The owner, Harrison, made application for a United States survey, which was made, including the two locations of 1,500 feet each. The survey was duly approved and advertised, and entry made of the 3,000 feet as one claim. In 1883 the Commissioner of the General Land Office set aside the entry and declared the land embraced in the two locations of 1,500 each to be open to relocation, on the ground that there must be separate application, surveys, etc., for each claim. And, notwithstanding the fact that the necessary entry money had been paid by the locators, the Commissioner decided that the claims were open to relocation the same as if no proceedings had been had. This was because the Commissioner thought that the annual expenditures should be made on each claim, and, this not being done, the claims were open to relocation. The owners supposed that application for patent having been made, there was no further necessity for regular expenditure.

An appeal to the Secretary of the Interior was taken by the owner, but the Commissioner denied the right of appeal, and refused to submit the papers to the Secretary of the Interior on the ground that his decision in the matter was final. Other papers were then prepared here, and Mr. L. L. Robinson submitted them directly to the Secretary of the Interior, without having them pass in the usual way through the Commissioner's office. The Secretary of the Interior then ordered the Commissioner to submit the whole proceedings and papers for review and decision.

The telegraph gives a synopsis of the decision of Secretary Teller in this case, reversing the Commissioner of the General Land Office, as follows: "That when a mineral applicant enters a claim pursuant to the legal requirements, such claim thereupon ceases to be part of the public domain, and is no longer subject to the operation of the laws governing the disposition of public lands; that in such case there is part performance of the contract on the sale, which entitles the entry man to a specific performance of the whole contract, without further action on his part; that the right to a patent once vested is equivalent to a patent issued, and that the proposition that the owner of contiguous locations, who seeks a patent, must present separate applications for each and obtain a separate survey and prove that upon each the required work had been performed, is wholly untenable."

New Amalgamating Pan.

In the ordinary construction of amalgamating pans it is customary to scatter the mercury through the pulp by means of rings or mullers, with shoes of various kinds, between which and dies upon the bottom of the pan the pulp is caused to pass, mercury being placed in the pan to amalgamate any gold which may be found in the pulp. The use of these shoes and dies on any rubbing or grinding surfaces is objectionable because they flour the mercury, and it is very difficult to again concentrate it into a mass and recover all of it from the pulp with which it becomes mixed.

Mr. George H. Malter, of the Etna Iron Works, the well known quartz mill builder of this city, has just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, an amalgamating pan in which the mercury is kept in one body or mass, and in which it is exposed to the eye all the time during the process, and can be treated with chemicals and kept in the most favorable condition to absorb the metal to be amalgamated.

In this new apparatus there are no mullers or dies, but the inside of the bottom of the pan is smooth, so that the quicksilver can spread over it and remain in one compact mass during the process of amalgamation, and is exposed to the eye in a quicksilver bowl placed outside the pan, communicating by means of a narrow channel or pipe with the inside of the pan.

Mr. Malter employs wooden or small metallic stirrers, which are fixed to the lower ends of the arms so as to just wipe over the surface of the mercury in the pan and keep a bright surface, into contact with which the pulp is constantly brought, so the particles of precious metals may be retained. The arms are vertical, nearly midway between the center and circumference, and at the top bend inward so as to form a sleeve at the center. This sleeve has a hub at the top which is keyed to a vertical shaft passing down through a hollow cone in the center of the pan, and is driven by a bevel gear in the usual manner.

Around the outside of the vertical portion of the arms is fitted a cylindrical band or sleeve of considerable width extending from the feet upon which it rests to or above the tops of the arms. This band is made of a substance to which mercury may be applied, this cylinder being designed not only to regulate the currents of the pulp, but also to collect the amalgam which will readily adhere to it as it revolves with the pulp. The cylinder can also be readily removed and the amalgam be collected from it. This band, from its depth, will prevent the pulp from flowing outward rapidly or directly by centrifugal action; but it will cause it all to flow beneath its lower edge, so as to come into intimate contact with the mercurial surface, which is kept bright by the wipers.

Passing up on the outside it rolls inward into contact with the outside of the amalgamated surface of the board and at the top flows over its upper edge toward the center and down the inside, being thus exposed to constant and repeated contact with a very considerable body of mercury, bright and clean, and the vertical amalgamated sides of the ring, while the mercury is not subdivided is broken up and thus lost.

An important advantage of the amalgamated band traveling in the pulp and in the same direction, is that the amalgam and valuable metal will readily adhere to the surface, and will not be rubbed off by friction, as would occur if the plate were stationary and the pulp formed a current over its surface.

On the outside of the pan is a siphon or cup, which is connected with the lower part or mercury chamber of the pan by a passage through which the mercury may flow and its quality or condition examined from time to time during the process of amalgamation. A discharge pipe leads out from this cup so that the mercury or amalgam may be drawn off at any time. The central cone is narrow at the top, and its diameter gradually increases at the bottom, the shape assisting to direct the pulp beneath the band and keep up the circulation.

THE Carhou Hill mine furnished us with a larger supply of coal last month than any other mine. This mine is owned by the railroad people. Another steamer is being built for the same trade, and both steamers will fail to bring all the coal needed by the railroad people.

Roasting Copper Ores in Piles.

The most approved methods of roasting of sulphide ores or mattes in lump form that are best suited to American conditions are three in number; 1st, roasting in piles; suited to either ore or matte; 2nd, roasting in stalls; suited to either ore or matte; 3rd, roasting in kilns, suited only to ore. Heap roasting has been discussed very fully by both Plattner and Kerl who have left little to add from a theoretical point of view. It is the cheapest method of desulphurizing pyritous ores; and the results of the roasting when properly executed and if the cover of the pile is well stripped off to the point where the cooling influence of the external air has interfered with the process of oxidation, are very satisfactory. It can be employed for ores carrying as low as 15 per cent. sulphur, providing a generous bed of flux has been placed under the pile; and ores containing as low as 8 per cent. can be successfully roasted by using coke fines, bark, or refuse wood with the ore. The principal drawback to heap roasting is the slowness of the process where the value of the copper must be tied up for from one to three months, and the fact that, owing to the great size of the heaps, it must be carried on out of doors, whereby much copper is lost by leaching, or fine dust, and trampling under foot while loading and unloading. A still more serious objection in agricultural districts is the escape of the sulphurous fumes into the atmosphere at so low an elevation and in such a concentrated form that before they can become so diluted with the surrounding air as to be rendered innocuous, they may do immense damage to vegetation, their influence frequently extending for several miles in the direction of the prevailing winds, and being peculiarly fatal to young growing crops.

In calcining tolerably pyritous ores, containing, say, 65 per cent iron pyrites Mr. Edward D. Peters Jr., suggests in a recent government report that a convenient size for the heaps is 20 by 50 feet, and 3 to 5 feet in height. A pile of this size, containing perhaps 250 tons, lighted on the leeward side, well covered with fines, and carefully watched, will burn about 9 weeks and will furnish a product containing from 6 to 10 per cent sulphur. Some weeks before the burning is completed in the very heart of the pile, it can be opened at the ends and two-thirds of its contents removed without seriously interfering with the process. As the whole advantage of heap-roasting lies in its extreme cheapness, every precaution should be taken to save expense in the handling of the ore. It is an excellent arrangement if the ore-car from the mine or dressing-house can be brought on a trestle over a long line of roast heaps, while the track which leads to the furnaces runs parallel to these and on a still lower level. By this arrangement the expenses of roasting can be reduced to a minimum, as the cars from the mine can be dumped directly upon the heaps, requiring only a little spreading into shape, and when the ore is to be carried to the furnaces it can be shoveled or wheeled from the heaps directly into the car, the top of which should be on a level with the ground on which the piles are built.

Smoky District.

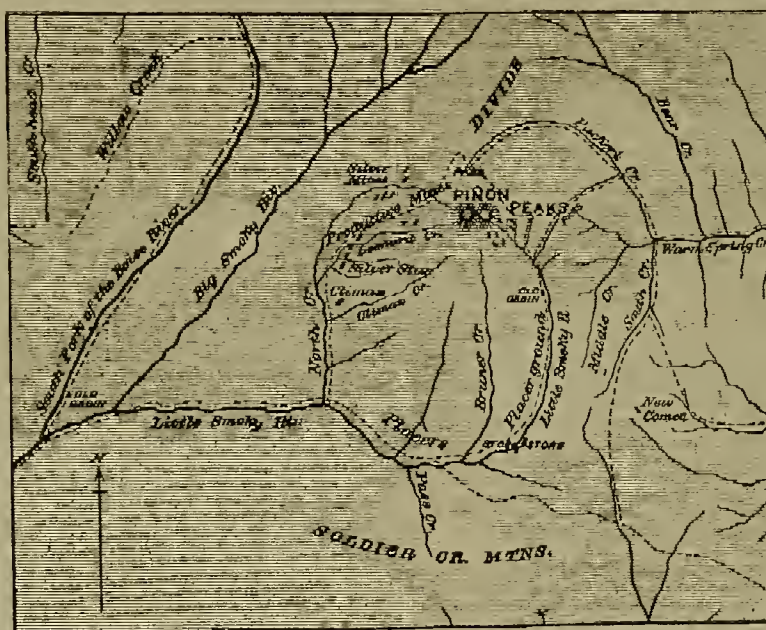
The mining districts of Idaho are just now attracting more attention than those of any other region. In continuing our description of them we give this week a map of Smoky District, 25 miles west of Ketchum. The ledges in that region consist of large veins of low grade galena ores carrying from 20 to 50 ounces of silver to the ton and from 30 to 50 per cent of lead. Among the mines are the Carrie Leonard, Silver Star, Salamander, King of the West and Climax. There is a large extent of country in this section of Alturas Co. still to be prospected and it offers a fair field of success. The winters are the chief drawback, but aside from deep snows they are mild and form no serious obstacle to working mines that are properly supplied with necessary material and equipments.

MR. MARSHALL, the original discoverer of gold in California, has presented the Society of California Pioneers with relics from General Sutter's mill at Georgetown, El Dorado county. They consist of the old mill's flutter-wheel, crank-shaft, set of dogs, an iron pike, a hammer, a gudgeon-band, etc. Accepted, with a unanimous vote of thanks.

New Dry Ore Separator.

The latest invention in the line of dry ore washers, or separators, has a frame or casing similar in appearance to that used in an ordinary fanning-mill, and a fan-case located at one end, with an opening through which a blast of air from the fan passes through into the body of the machine.

On top of the casing is a hopper which extends across the full width of the machine and has a slot at the bottom with a sliding gate to regulate the feed. From this feed-opening the sand or gold-bearing material passes between two rollers, one of which has a driving pulley at its outer end and turns in stationary journal-boxes, while the other has its journal-boxes arranged to slide in horizontal guides and has springs behind them so that the roller may move back when large or hard pieces pass between them. These rollers are designed to break up and separate any masses which may be lightly cemented together, so as to liberate particles of gold which may be entangled with them. From these rollers the material is delivered upon a screen or sieve which has a reciprocating and an up and down motion given to it by means of eccentrics. The heavier coarse gravel or material is discharged over the outer or rear end of the sieve, and the finer particles



SMOKY MINING DISTRICT, IDAHO.

fall through upon an inclined amalgamated plate or table, the front end of which is lowered. This plate has channels across it to contain mercury, in which the gold will fall to be amalgamated. The remaining material falls over the front of this plate and through the air-blast from the fan, which blows the finer dust out through the rear end of the machine. The remaining material falls upon an amalgamated plate which slopes slightly downward toward the rear and is given an reciprocating shaking motion by means of eccentrics upon a shaft at its rear end. This plate or table has channels formed across it, and filled with mercury, for the purpose of retaining and amalgamating any gold which may pass while the waste is discharged over the rear end. Both the plates or tables have flanges inclining upward and outward from their sides to prevent the overflow of the material in this direction.

A wind board lies between the upper and lower amalgamating tables, and may be adjusted to give strength and duration to the blast. Above and below the blast, opening from the fan case, are placed direction-boards. The upper one is the broadest, and inclines downward, so that sand falling from the upper amalgamating table upon it will be directed off upon the lower tables. Both these boards are adjustable to alter and control the duration of the air-blast, and are held in place by thumb-screws passing through slots in the sides of the case. This apparatus has just been patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Herbert Earhart, of Santa Maria, Santa Barbara, who has assigned two-thirds interest to H. D. Livingston and Joseph Kaiser, of this city.

THE British Columbia coal mines sent to this port in May 20,125 tons of coal.

Prices of Powder.

A few weeks ago we stated in the PRESS that the powder companies of this city had been for a long time making no profit on their manufactures because of the low price to which powder had been reduced by close competition. We stated also that shortly the companies would agree on certain prices which they would maintain. Ever since the low prices have ruled for powder, brought about by the competition, no profit of any kind has been earned. On the contrary, heavy losses had to be sustained in many instances. This has resulted in a combination of the different powder companies, and it has been resolved unanimously to raise the prices. Bandmann, Nielsen & Co., general agents of the Giant Powder Co., have issued a circular, from which we take the following, concerning the new rates:

"No. 2, or second-grade powder, 24½ cents free on board here. In car load lots, 1 cent per pound less. Our No 2 powder contains 40 per cent nitro-glycerine. For powder above this strength, add ½ cent for each additional per cent of nitro-glycerine; below 40 per cent, deduct ½ cent for each per cent nitro-glycerine less than 40 per cent."

"The above prices are still very low, but the different companies concluded not to raise the same to that standard which would leave them a reasonable profit, preferring to retain the good

The Iron Moulders' Strike.

The iron moulders employed by the Agricultural Iron Works struck in response to orders issued by the Iron Moulders' Union. The trouble appears to have been caused by the employment in the works of too many boys and non-union men. In a circular which the Iron Moulders' Union sent to all the foundries last July, the union demanded that each foundry should employ no more than one boy for each foundry, and one boy for each eight moulders working therein. Consequently, upon an alleged fracture of this demand by Byron Jackson, the proprietor of the Agricultural Iron Works, the union ordered its men out.

In an interview with a reporter, Mr. Jackson stated that he received a circular from the union last July, but took little notice of it, and on the 15th of last month discharged ten men, retaining only four men and eight boys. Several days later Mr. Jackson received word from the union, informing him that he was employing more boys than the circular which had been sent him in July allowed. Mr. Jackson replied by letter, informing the union that he intended to exercise his right to employ whomsoever he saw fit, and if he chose to give the boys a chance he would do so.

So the situation stands at present. Mr. Jackson, although not willing to state his definite plans, says he hopes to secure non-union men, being willing to make contracts with such by the year and pay the highest wages. The striking moulders, according to the statement of several, are fully determined to make a stand against the practice, as they say, of overstocking their trade by the employment of boys in an excessive number.

The Moulders' Union is also engaged in a lockout with Holbrook, Merrill & Stetson and W. W. Montague & Co., who are joint partners in the Pioneer Stove Works, on Beale street. This was started as an experiment two years ago, and the proprietors intended to give the boys a chance to learn a trade instead of growing up as hoodlums. Everything went smoothly until the union took the matter up, and the result is that the men have left and the proprietors have virtually closed the foundry. The Superintendent, with a few boys, is doing some trifling amount of work. The proprietors state their determination to be independent of all interference from the Moulders' Union.

MECHANICS' FAIR PRIVILEGES.—The Board of Managers of the Mechanics' Fair received the following bids for privileges: By J. E. Sellers, for restaurant, \$156.75; ice cream, \$906.75; popcorn, \$236.75; by George Howell & Co., for popcorn, \$310; by W. Greer, for perfumery, \$100; by Stoddard Bros., for perfumery, \$100; by H. L. St. John, for root beer, \$126; by George Haas, for candy, \$777; by John C. Harshorn, for popcorn, \$257; by G. A. Blank, for candy, \$583.20; by Mrs. A. S. Hart, for ice cream, \$637.50, and for restaurant, \$237.50; by M. Moore, for cider, \$155; by Geo. C. Thompson, for soda, \$827.50; by Justin Gates, for soda, \$800, and for cider, \$230; by D. E. Ciphers, for restaurant, \$305.50; for popcorn, \$307.50; for ice cream, \$876.50, and for candy, \$736.50; by George Spaulding & Co., for printing, \$500. The bids were referred to the Committee of Privileges to report at the next meeting.

At a meeting of the stockholders of the Virginia & Truckee Railroad Company, held at their office in Virginia City, Monday, the following Directors were elected for the ensuing year: D. O. Mills, Wm. Sharon, H. M. Yerington, I. L. Requa, J. W. Eckley, D. L. Bliss, J. E. Wratten, W. H. Blauvelt and H. P. Cohen. At a subsequent meeting of the Board of Directors, the following officers were elected for the ensuing year: D. O. Mills, President and General Superintendent; E. B. Yerington, Secretary; Bank of California, Treasurer; D. A. Bender, General Freight and Passenger agent. The following are the appointed: A. M. Ardery, Master of Transportation; Hume Yerington, General Supply Agent; R. H. Wright, Auditor; George T. Mills, Paymaster; C. C. Atherton, Roadmaster.

ANTI-DRINKS MEETING.—Pursuant to a call of the Supervisors of Yuba and Sutter counties, members of the boards of Colusa, Yolo, San Joaquin, Sutter, Yuba and Sacramento counties met Wednesday, in Sacramento, to devise means to check hydraulic mining. J. F. Flatham of Yuba was Chairman. Mayor Blingham of Marysville spoke and urged upon the different boards the necessity of stopping the flow of sicken forever. He said that whether the valley people assisted or not, Marysville would war with the hydraulic miners until she was victorious. A committee was appointed to decide on the mode of action.

THE United States Mint in San Francisco reports a coinage in May of 91,000 Double Eagles, 300,000 Standard Dollars and 175,000 Hawaiian Dollars. The last named completes the order for \$1,000,000 received a few months ago from the Hawaiian Government. The coinage for May and since July 1, 1883 for account of the United States Government has been \$16,913,500.

THE San Francisco mint has just finished coining \$1,000,000 for the Hawaiian Government.

will and friendship of all consumers. Of course we, like all other powder companies, expect you to obtain better prices. Those given above are the minimum prices at which powder can be sold."

THE Portland Oregonian says: "In digging the well to supply the railroad tanks at Palouse Junction, W. T., the workmen passed through strata of alkali, clay and finely broken basalt rock, to a depth of 185 feet, where water of great purity and limitless quantity was found. The water in the well is five feet deep, and a steam pump actively worked, makes little impression on the quantity. The most curious thing about the well is the fact that in digging the last fifty feet the workmen in the well had to wear heavy clothing and wrap their feet and legs in gunny bags to keep them from freezing, while the men in the open air worked in their shirt sleeves. Water left in the bucket in the well over night would freeze. The water in the well does not freeze because it flows too fast. The new well at Eltopal is seventy-five feet deep, nearly all the distance being through clay. The first twelve feet are through solid white alkali."

THE Helena (M. T.) Independent says: "Miners in the upper district of Mill creek, Gallatin county, say that never in their experience of many years have they seen in that locality such terrible snowslides as have occurred there during the past week or two. The snow lay in great masses on the mountain sides until the late warm weather, and now it comes down in the form of avalanches, carrying everything before it, stripping bare the sides of the mountains and filling the ravines with mingled masses of snow, rock and broken timber."

SUPERINTENDENT McCARDY, of the Paradise Valley Mine, returned from Virginia City, where he had been getting some machinery repaired. Late at night, on his way from Paradise Valley to the mine, he met some of the miners employed in the mine with a team loaded with ore worth \$5,000 per ton. He had five of the miners who are implicated in the theft arrested.

Reeder Gulch at Cœur d'Alene.

The following we take from the Cœur d'Alene Pioneer: The developments made in Reeder gulch have been the talk of the creek. The discovery of extensive veins of quartz along the gulch is a matter of no surprise. It has long been known that some of the best gold-quartz float has come from this vicinity, but it was reserved until the past two weeks to prove that one of the most extensive ore bodies ever discovered exists within the confines of Butte and Reeder gulches. Reeder is a tributary of Pritchard creek from the north, and is 1½ miles north of the town of Murray, and only a few hundred yards east of Butte. It is about a mile long, and forks about ½ mile from its mouth into two prongs, one of which continues northerly and the other north-easterly.

The hillsides and gulches are covered by great quantities of float quartz, and the bed of the main gulch has long been located as placers. The float lays in boulders, many of which are of huge dimensions. The immense boulders of quartz did not attract attention until recently, when it was found to prospect well in gold. Since then the entire country has been located, and it is estimated that the float alone is sufficient to keep a fifty-stamp mill running for two years. The float absolutely covers the whole country between the two forks, and will average from \$20 to \$100 per ton. Some of these boulders would take a miner a month to break up, and on the Claggett lode there is sufficient float above the grass-roots to keep twenty men employed for a month. The discovery of the value of this quartz cannot be over-rated. The following up of this float to several mammoth veins has created an additional furor. A large number of veins have been located, and in every instance the ore shows free gold in more or less quantities. The general course of the ledges is northwest and southeast, with a slight dip to the west. As far as known they lay in a succession of parallel contacts of slate and porphyry. Slate is found on the foot-wall and porphyry on the hanging, and the formation is a desirable one on account of the ease with which it can be worked.

In the main gulch you first come to the Homestake, which was discovered by John King and Florence McCarthy on the 1st of March. It is on the west side of the creek, and crops out on the hillside 15 feet wide for a distance of 50 feet. Only a little surface work has been done on it, but the ore shows gold plainly.

Following up the creek we come to the forks where the Claggett lode is located. John King, Judge Claggett, Richard Lowe and John Flaherty are the owners of this claim. It is within a few hundred feet of the creek and runs in a north-easterly direction. The claim is covered by huge boulders of quartz, which of itself is of great value. The same parties have made an adjoining location called the Friend. It runs up the right hand fork and is likewise covered by huge masses of quartz.

The Golden Gate is above the Claggett lode, and is owned by D. T. Hayes, D. S. Ferguson, Al. Holman, Wyatt Earp, Chas. Foley, Joseph Williams, Jno. Enright, W. Osbourne, Robert Graham and Jobu Cocoran. A shaft is sunk a distance of 30 feet, and the vein holds good for that distance. Assays of an averaged sample returned \$83.09 gold and 60 cents silver per ton. It is one of the most promising lodes yet discovered.

The Poorman and Jenny are parallel veins. The former is east of the Claggett and the latter north. Both show the same variety of ore.

A description of the Kate Burnett has appeared in our columns. It is still one of the best claims on the creek, and the daily developments show up richer and more extensive ore bodies. The ledge is seven feet wide and solid all the way down. It is safe to say that every pound of the ore will pay to mill.

Chas. Copeland has a location below the Kate Burnett called the Golden Chest, on which stand huge cropping and boulders of quartz. There is an immense amount of ore in sight. Little work has been done on it. It is the general belief that the float is from the Kate Burnett lode.

North-east from the Kate Burnett is the Henry Clay, owned by Hawes & Hicks. The ore is the richest yet found in the locality. Large nuggets are met with frequently, and scarcely a piece can be found which does not show gold plainly. It prospects richly in a mortar, and the vein is regular and solid. It runs parallel with the Kate Burnett.

On the left hand fork of Reeder gulch is the Unknown, owned by McCarthy and King. The ledge is four feet in width and nine inches of it has an assay value of \$150 per ton.

Over from the right hand fork of Reeder gulch, a sharp ridge comes down, which divides Reeder from Butte gulch. This hill contains several locations of the same general character as those found between the two forks of Reeder creek. In the Check claim there are three feet of good milling ore opened up, and in the Idahoan, owned by Bryan Rossiter and F. McCarthy, there are several large cuts which intersect the vein in as many places. They all show from 2 to 3 feet of fine ore. The Paymaster was located last year and has a fine body of ore exposed. The vein is a mammoth one, and when it is remembered that it is high grade, its value can be appreciated. Old miners who have visited the Paymaster claim that not less

than 10,000 tons of ore is in sight. It is owned by Patrick Flynn, T. R. Bentley, Robt. Smith and Wm. Curry. The claim is covered by masses of float quartz, and there is enough for a 50-stamp mill to run on if not another pound were mined for two years.

The snow is still about the head of Butte creek, but as far as the line extends float quartz is found. It seems as if the hills between the two creeks were one mountain of gold quartz.

The McNair Furnace.

As there is a movement on foot in this town to organize a company for the establishment of smelting works, using the McNair Furnace, when in Denver last Tuesday we called on Mr. J. K. Hornish, President and General manager of the Vulcan Smelting Mining Company, which made the test of these furnaces at the Miner's Smelting and Reduction Works at Golden. We also met there Edward O'Neill the practical metallurgist, who runs the furnaces. He seemed to be a very careful, practical conservative man and confirmed what he has heretofore certified to in relation to these furnaces.

It is to be borne in mind that the Vulcan Company, running the McNair furnaces, had nothing to do with the "Miner's works" which were closed at Golden. The McNair furnaces were simply given room in the building for the purpose of making their tests, which were claimed to have been in every way successful. But the following is what O'Neill has to say about it:

"We started the first McNair gas furnace, at our works, April 15th and tested it, against the best furnace in our works for thirty days, the charges being equal in weight and quality. The McNair gas furnace saved 58½ tons coal over the Standard furnace, during those thirty days. July 15th we shut the furnace down, for three days, in order to test the saving in the condensing flues, and found it to be at the rate of \$150 per month. July 18th we made another test for twenty-six days, with the following results: saving 64 tons of coal, and doing equal work with the Standard reverberatory furnace. We, now, have been running this furnace for five and a half months, and it has not cost anything for repairs, while the other furnaces cost, on an average \$25 per month for repairs.

"We were so well pleased with the first gas furnace that we built the second; started it August 19th and run it for forty-two days, against all the other furnaces, smelting 115½ tons more ore than any of the other furnaces, and saving 61½ tons coal, over our best Standard reverberatory furnace. The coal used in the gas furnace, was half fine slack, and unfit for use in the other furnaces. The coal used in the Standard furnaces was select lump. The McNair furnaces was easier to handle, and will run longer without repairs, than any furnace that I have ever seen. The furnace has given such good satisfaction at our works, that I think it only a question of time until it is adopted for the treatment of all kinds of ore in Colorado."

The point of most interest to us in Boulder is that our lignite coal, even the nut coal, and slack, can be used for smelting with this furnace, but will not do for the Standard furnace. That's what we've always wanted, to have the coal of the valley, and the ores of the mountains met here in Boulder for reduction.

To make the enterprise a success it is essential that both the people of the town and of the mountains take an interest in the works; that it be in the hands of practical business men, that in addition to the cost of the plant there be a fund for the purchase of one.

At the meeting in this office last Saturday, a committee of citizens was appointed to visit Denver to see Messrs. Hornish and O'Neill, and inquire into this whole business. We hope the result of this spirit of enterprise will be something to build up the town, and to stimulate mining.—Boulder Courier.

NEVADA.—A correspondent of the Virginia Enterprise, in speaking of Nevada as a mining region, says: I wish to say right here that the very existence of this State is dependent upon the extraordinary pluck, energy and grit displayed by just such men as those mentioned, who, in the absence of capital, devote their brawn and intelligence to the development of mines that would otherwise lie idle and unnoticed. In the majority of cases the poor prospector, fighting against discouragements and hard luck, but hanging on with bulldog tenacity in the hopes of eventually striking it rich, is the lever that moves the destinies of Nevada. It is often said that Nevada's agricultural industries are becoming paramount to all others, but every old inhabitant of the "Silver State" knows well that the backbone of this State is in her mineral wealth. Her welfare is more intimately connected with the production of bullion than raising potatoes; of supplying the hard material from which dollars are made than in causing carrots to sprout. Were the mines closed where would be the market for field products? The approbation with which Cassidy's speech on the silver question was received and the avidity with which it was read shows plainly how vital is the subject to us all. Grantsville, Downieville, Ione, Ellsworth and other old camps, once important, languish in desolation and inactivity, awaiting the introduction of the capital that will make them banner producers, and that seem so "backward in coming forward." Still, I firmly believe that there is a happy future in prospect for them.

Crime in Our Towns.

Why is there so much crime, lawlessness, discontent and social disorder in our large towns and cities, is a question that concerns us all. The fact is undeniable. The explanation of the fact is the question. Among the many that may be given we propose to suggest one which is specially applicable to the cities and towns of America. We are inclined to think that this state of things is largely attributable to the confusions and admixture of alien people, with race prejudice, jarring ideas, habits, politics, morals and religion.

Professor Leseley, in his lecture on the "Unity of the Race," says: "Our modern cities are the gravel banks of humanity." We all know what a gravel bank is. Examine one, and it will be found to be a big heap of pebbles, of quartz, of porphyry, gneiss, syenite of nearly all shades of color, white, black, red, green and blue, perhaps infiltrated with dirt and the worst of shales and sandstone. The geologists will tell us that this heap of curious pebbles, cobble stones and sand is not a native production of the place where we find it. That each particle is a stranger and an alien in the land. That once, perhaps a million of years ago, there was an ice deluge that covered half the globe, when there was a winter and a snow-storm which may have lasted for thousands of years stretching all the way to the North Pole. That as this awful winter began to abate, glaciers began slowly and imperceptibly to slide down the mountains, abrading off particles of all sorts of rocks and dumping the whole load at last into one big pile.

In like manner our towns and cities are a huge conglomeration of the disintegrated races of mankind. Here are representatives of the Slavonic race from Suabia, Switzerland, Bohemia, Moravia, Austria and Hungary. Here are representatives of the Teutonic race from Northern Germany and Scandinavia. Here are Celtic people from Ireland, Wales and the northwest of Scotland and the northwest of France, and half-breeds of the same blood, Celtiberians as they are called, from Spain and Italy. Here are the Lowland Scotch and English, a Mongrel people made up of Celtic, Saxon, Norman and Slavic streaks of blood. Here are the black race, first brought to this shore on those pitiless icebergs, the slave ships, and sprinkled into this confused mass are Coolies from China, Malays from Singapore and Kanakas from Hawaii. A babel of languages, race prejudices, alien ideas, traditions, feelings and customs all closely packed and huddled together in the narrow limits of the city. Towns and cities in all ages have been conglomerates of races, but never has this accumulation of alien people been on so large a scale as in the towns and cities of America, growing out of the fact that this country for a century or more has been the chief asylum of the immigrating classes of the whole world, giving to all a cordial welcome. That all this inflow of foreign blood, this vast jumble and hodge-podge of alien ideas, traditions and habits can manage to live together happily and harmoniously, pent up in corporate limits, in the very nature of things is impossible, and we have learned by sad experience that the largest part of our social disquietude, ignorance, pauperism, vice and crime, come from exotic races.

Now, many who seek the hospitality of our land come from a high civilization, are educated, intelligent, thrifty, enterprising, love the land of their adoption, easily affiliate with its political ideas and institutions, and become good citizens. But thousands who crowd the immigrant ships belong to what are called in Europe the lower classes, and are ignorant, superstitious, brutalized by servile labor and abject poverty. They come here to better their condition, and expecting to find a promised land, "flowing with milk and honey," and, on being disappointed, become restless, unhappy, and may be easily led by unscrupulous leaders and demagogues into all sorts of lawless excesses. Many of them import here political doctrines that are in direct antagonism to our institutions, and are promotive of social disorders. Socialism, communism, Jacobinism, Kearnyism and dynamite warfare are all exotic ideas, worse than the Canada thistle to the New England farmer. Out of this caotic and incongruous element came the New York riots, the Molly Maguires in Pennsylvania, Sand Lot rioters of San Francisco, and a majority of the inmates of the hospitals, the asylums and penitentiaries. Out of this medley of races there may emerge some day a new form of civilization—a sort of metamorphic rock in the geology of humanity; but in the meantime we are weltering in the agony of this chaos, and must expect a great deal of trouble before the new order of things comes forth.

THE LARGEST RAILROAD CONTROL.—The London Economist is the authority for the statement that the Pennsylvania Railroad Company controls the largest income of any joint stock company in the world. The greatest English company—the London and Northwestern Railway Company—last year earned a gross \$53,500,000, or, including "controlled undertakings," possibly \$60,000,000, while on the continent the most important line—the Paris, Lyons and Mediterranean—earned a gross \$70,000,000. Such figures are a long way short of the Pennsylvania receipts, which exceeded last year \$100,000,000.

Sierra County Quartz.

The Sierra County Tribune says: The facts fully warrant us in saying that ere another twelve months rolls around Sierra county will have taken the lead above all competitors as the banner mining region of California. In the Sierra City district alone there are at the present time 90 stamps pounding away night and day on good paying ore. To our certain knowledge 80 more stamps will be in operation in that vicinity before snow flies next fall. In this estimate we are not counting two or three other mining enterprises that are more than likely to assume a tangible shape this summer. There are numerous gold-bearing ledges in the district which will surely secure the substantial co-operation of capitalists as soon as their attention can be directed to them. In the southern portion of the county mining affairs have been somewhat under a cloud for the past couple of years. This has resulted from several causes. The Alaska mine, at Pike City, was just getting in a condition to pay handsomely when a fire swept away the shaft works, involving a moneyed loss upon the company of some \$40,000, and the stoppage of work for one year. This was a great misfortune to Pike City, and indeed to the whole county. But now operations have been resumed at that mine, and it will not be long before the pleasant music of the 20-stamp mill will greet the ears of our Pike City friends again. The history of the Golden Gate and Harlen mines, Alleghany, is too well known to require repetition. Suffice it to say that the manner in which those mines were operated proved a great detriment to the mining interest of that section, and served to put a damper upon other enterprises that might have been inaugurated. However, the uncovering of the Rainbow bonanza and the taking out of a couple hundred thousand dollars in a few months' time, bolstered up the condition of things, and convinced outsiders that it only required proper management and a little pay-grit to reap golden treasures from the mineral veins of Old Sierra. The Rainbow Company are now pushing ahead a new tunnel that will give them several hundred feet of stoping ground and insure a big paying mine for years to follow. New enterprises are being talked about over that way, which, when carried out, will add greatly to our mining prosperity. One word more concerning the Sierra City district. The Sierra Buttes mine will in a few months give employment to between 300 and 400 miners. At the Columbo mine there are some 60 men employed, and the resuming of work at the Marguerite mine will insure the employment of a big force there. Altogether, the Tribune is well satisfied that its predictions made in past months are coming true, and that Sierra county will wear the banner.

The Harrison Mining Machine.

Important mining machine experiments have lately been made in the presence of a number of colliery proprietors, Mr. Robson, Assistant Inspector of Mines, and others, at Alloa Colliery. Mr. D. Whitcomb, Chicago, arrived in Scotland a month ago with the view of bringing the Harrison improved mining machine before the notice of colliery proprietors. He obtained permission from Mr. Roxburgh, of the Alloa Coal Company, to test the machine, and, accordingly, he had three introduced into the Whimhall pit. Two were taken to the long wall workings, and one to the stoop-and-room, so that a thorough test might be made in moderately soft and hard coals. The machine is adapted for holing and cutting, or, technically, shearing coal, and is worked by compressed air. It weighs 600 pounds, and is therefore easily removed from one place to another. The machine, when in operation, requires two men in attendance, and strikes from 190 to 210 blows per minute. The operation is exactly similar to that of a vertical bore. The experiments were considered most satisfactory, and in the long wall the machine repeatedly drove a piece of holing six yards in extent in a distance of three feet in twenty minutes, the men in attendance showing less signs of exhaustion than those engaged with the picks. In the stoop-and-room, where the coal is exceedingly hard, the work performed has been remarkable. In a tough fire-clay holing the machine pierced over and over again a hole five feet square in 26 minutes, while the shearing was cut in a distance of four feet in a coal fully as many feet in thickness in 23 minutes. Mr. Whitcomb claims that two men and one of his machines can perform as much labor as eight skilled miners. As to the expense, it appears from the experiments in mines where six machines might be introduced, the wages of three men to each machine would meet all the outlay incurred in every connection—that is to say, that 4s. 6d. per day would meet the expense of the driving power, etc., of each machine. One important feature is the fact that the continual freeing of the wasted air improves considerably the ventilation of the workings. We learn that Mr. Roxburgh has signified his intention of introducing the Harrison machine in every seam practicable, and it is expected that other Fife and Clackmannan coal miners will follow suit.—Iron.

Truman's Process.

From a letter in the *Virginia Enterprise* we make the following extract: Not far from Belmont are large deposits of base ores, so wonderful in extent and rich in noble metals that attention was often directed towards them and attempts made to successfully extract the enormous wealth in gold and silver contained therein. Until quite recently the rebellious character of the ores resisted all efforts to bring their reduction to a practical paying basis. The ore can be found in Tybo and Smoky Valley in unlimited quantities, many of the ledges reaching five to thirty-three feet in width, ascertained from actual measurements taken by the writer. The ore consists mainly of zinc, and is the same generally known in Nevada as Black Jack. One ledge, in the Toiyabe range, was analyzed and proved the mass to be made up of zinc, 33 per cent; gangue or insoluble matter, 30 per cent; lead, 9 per cent; copper, 3 per cent; gold, \$5; silver, \$50. Besides the minerals mentioned there are small quantities of iron, antimony and other substances. Mining men can readily understand how difficult is the successful reduction of such a conglomeration. In the first place it has been almost impossible to roast the zinc in ordinary furnaces without losing a large percentage of silver. Next, the zinc dirties the silver so much that the mercury in the pans cannot attack it, but attaches to the zinc and much silver is lost. The bullion, also, is rendered so base as to be almost worthless.

John B. Truman, an old resident of Nye county and for several months of this town, recently became interested in three extensive deposits, and set about making a series of experiments, which thus far have surpassed his most sanguine expectations. It is probable that his system will shortly bring this county into her old prominence and importance as a bullion producer. Indeed, the entire State may leap into renewed activity and prosperity—"a consummation most devoutly to be wished."

Mr. Truman proposes to first carefully oxidize and chloridize the ores after a method of his own, and then gradually leach the pulp in tanks, through which clear, cold water constantly percolates. Zinc being easily soluble, when well chloridized, passes off with the liquid, leaving the residue in a suitable condition for rapid and thorough amalgamation. By this method the bullion will reach a fineness hitherto unattainable, and all the gold will be saved, gold and silver being insoluble in water. Mr. Truman has applied for patents for his system of tanks and pans, which to say the least is every ingenious. Should the magnificent deposits of Black Jack existing in this county be thus worked, a boom will commence that will echo from the Pacific to the Atlantic. Tybo has untold quantities of this variety of argentiferous mineral that will assay \$60 to the ton in silver, while the Toiyabe range fairly glitters with a similar character of ore. Colorado, New Mexico, Arizona, Idaho, Montana and Utah, and many other States and Territories, besides Nevada, will come to the front in a manner that will astonish the natives. Your correspondent will describe the whole process at greater length and with more accuracy in a future article. For the present, it is sufficient to say that practical millmen hereabouts fully indorse the plan, both as regard the idea of leaching and amalgamating, which is well known, and the peculiar application of the tanks and pans in a manner as novel as it is original.

EFFECT OF THE SAWYER DECISION.—One year ago Brandy city was a prosperous, thriving mining town. The Brandy City mine was then running in full blast and giving employment to some thirty white miners. The future outlook of the town was encouraging. The above company had at that time just got in at a big expense the machinery for running a drain tunnel. That tunnel would have cost a large sum of money and benefited the town accordingly. But now all this is changed. The Brandy City mine has been forced to cease operations. The most valuable gold mine in Sierra county is now lying idle, and a large number of people who were dependent upon its working for support are now left without the means of earning an honest livelihood. The business men and residents of that place are free to confess that the situation is anything but cheering, and many of them are arranging to move away. Judge Sawyer's decision is working terrible hardships to people in the mountains, and with the power that it places in the hands of unscrupulous men there is no telling to what extent it may be used to force blood money from the miner. We honestly believe that such tactics have already been resorted to by men who profess to stand high in the estimation of their fellow citizens. Because the miner is at present the under dog in the fight, it is no sign that he will always remain so, or that he will quietly submit to persecution while in that position.—*Sierra Tribune*.

HERE is the principle adopted by the Lawrence, Kansas, capitalists, who own the Organ smelter, near Las Cruces: "The smelter will not run on Sundays. The fires will be banked up and the furnace kept warm, but no metal will be tapped.

USEFUL INFORMATION.

What Will Burst a Gun.

In bravado a young man placed the muzzle of his fowling piece under the water and fired the charge. The result was the bursting of the barrel near the breech and the mutilation of his hand. Another placed and held the muzzle of his piece square against a piece of plate window glass and fired the charge—powder and bullet. The glass was shattered, so was the gun barrel. Another instance was that of an experimenter who had heard that a candle could be fired from the barrel of a gun through an inch board. He drove a candle into the muzzle of the gun, fired, and the explosion split the barrel almost its entire length, and did not even drive the candle from the muzzle. Still another burst of a gun barrel was caused by the use of wet grass for a wad, well rammed down over a charge of shot. But perhaps one of the most singular exhibitions in this line was a Colt's navy revolver, which some years ago was sent to the factory in Hartford, Conn. This was before the adaptation of these pistols to the metallic cartridges, and it is probable that in loading with open powder and ball only a small amount of powder got into the chamber, and the bullet was not propelled with sufficient force to drive it from the muzzle; at least the bullet did not go out, but lodged. As the shooter did not know whether the bullet escaped or not, he kept on firing until the barrel burst or bulged, and when it was sawed in two longitudinally there were found fourteen bullets wedged one into the other, and so much "upset" by the hammering of the successive explosions of the powder charges that some of them were not less than one inch diameter, being flattened disks instead of conical bullets.

Effect of Names on Value.

Taking arrowroot as an example. To a chemist arrowroot is starch in as pure a form as can be found in nature, and he applies this description to all kinds of arrowroot; but, looking in the "price current" in the *Grocer* of the current week (February 16th), I find under the first item, which is "Arrowroot," the following: "Bermuda, per pound, 1s. to 2s." "St. Vincent and Natal, 2½d. to 3½d.," and this is a fair example of the usual differences of price of this commodity. Nine farthings to ninety-six farthings is a wide range, and should express a wide difference of quality. I have on several occasions, at long intervals apart, obtained samples of the highest priced Bermuda, and even "missionary" arrowroot, supposed to be perfect, brought home by immaculate missionaries themselves, and therefore worth three and sixpence per pound, and have compared this with the twopenny and threepenny "St. Vincent and Natal." I find that the only difference is, that on boiling in a given quantity of water, the Bermuda produces a somewhat stiffer jelly, the which additional tenacity is easily obtainable by using a little more twopenny or I will say fourpenny, to allow a good profit on retailing to the same quantity of water. Putting it commercially, the Natal, as retailed at fourpence per pound, and the Bermuda at its usual retail price of three shillings, I may safely say that nine ounces of Natal, costing twopenny farthing, is equal to eight ounces of Bermuda, costing eighteenpence. Both are starch, and starch is neither more nor less than starch, unless it be that the best Bermuda, at three shillings per pound, is starch, plus humbug.—*Popular Science Monthly*.

RESTORATION OF FADED PHOTOGRAPHS.—It is only to immerse the yellowed print in a dilute solution of bichloride of mercury until all the yellowness disappears. It is then well washed in water to remove the mercurial salt. If the print be a mounted one, it is by no means necessary to unmount it previously to treatment. All that is required in this case is to keep it in intimate contact for a time with blotting paper charged with the bichloride; indeed, this is the plan originally suggested by Mr. Barnes. By the bichloride treatment no lost detail is actually restored, as some have imagined. It is simply that the sickly yellow color which, as it were, buried the delicate half-tints, or what remains of them, is removed, and thus renders the picture bright and clear. Pictures which have been treated with the mercury always possess a much warmer tone than they did originally, as the purple or black tones give way to a reddish brown or reddish purple—more or less bright according, probably, as gold or sulphur had been the principal toning agent. Here a question very naturally arises with regard to the future permanence of pictures which have been thus "restored," seeing that negatives intensified with mercury or transparencies toned with it are so prone to change. In answer to this we may mention that they appear to be permanent—at least that is our experience with some that have been done for many years. There appears to be no further loss of detail, and the whites retain their purity. Indeed, since undergoing the treatment with mercury, no alteration is yet perceptible.—*Br. Jour. of Photo.*

VIENNESE bread is celebrated. It may interest the reader to know something about it. The excellence of the bread is attributed in Vienna to three reasons—the oven, the men and the yeast. I think another may be added, and that is the dry climate. An ounce of yeast and

as much salt is taken for every gallon of milk used for the dough. The yeast is a Viennese specialty, known as "St. Marxer Presshefe," and its composition is a secret. It keeps two days in summer and a little longer in winter. The ovens are heated by wood fires lit inside them during four hours; the ashes are then raked out and the oven is carefully wiped with wisps of damp straw. On the vapor thus generated, as well as that produced by the baking of the dough, lies the whole art of the browning and the success of the "semmel."

CORK BRICKS are a new building material recently introduced into some parts of Europe. The material used in these bricks is a mixture of cork, silica and lime. It is stated to be a perfectly durable material, guaranteed not to rot. It has the advantage of keeping out heat and cold. It is light in weight and easily applied. An interior wall might be built of it where an ordinary brick wall would be too heavy, whilst it would be equally durable and substantial. It is nailed up to laths as a covering under roofs or for ceilings, for wall linings, and for under floors, as it is said to be an admirable preventive of damp, and a sound preventive also. The mode of application of this material is an easy, says an exchange, that, its good qualities being taken for granted, a large use of it must follow. It is stated to be in extensive use in Germany.

SAWDUST IN MORTAR.—Sawdust is said by some one to be better than hair in protecting rough cast from peeling and scaling under the influence of frost and weather. The sawdust should be first dried, and then thoroughly sifted in order to remove the coarser particles. A mixture is then made of two parts sawdust, five parts sharp sand, and one part cement, which should be thoroughly stirred together, and then incorporated with two parts of lime. It is claimed to be cheaper, lighter, warmer, more porous, than ordinary mortar, and by its non-conducting qualities causing the inner surface of the walls to retain the heat which sand plastering allows to escape.

CASTOR OIL is said to be a good lubricator for machinery by reason of its great adhesiveness and elasticity. On this account it is also comparatively cheap; cheaper, in fact, than many of the lubricators, axle greases, etc., offered for sale, which are often, for the sake of increased weight and volume, adulterated with worthless and even deleterious substances.

COTTON SEED HULLS are being substituted for cotton waste for packing journal boxes of railway cars, and are said to effect a saving of fully one-half the cost and to answer a good purpose.

GOOD HEALTH.

Water Poulitices.

A water poultice for the throat may be made as follows: Take four thicknesses of old cotton cloth, three or four inches wide, and long enough to extend from ear to ear. Dip it in water, hot or cold, as the condition of the throat may require. Over these folds of cotton cloth apply a layer of cotton-battening, an inch in thickness, and long and wide enough to cover the cotton cloth. Over this place a strip of waterproof cloth, or oil-silk. Apply to the throat, and keep in place by a bandage.

This poultice, if cold, will induce a local sweating, that will relieve the mucous membrane, or inner lining of the throat. When nearly dry, wring the four folds of cotton cloth again in cold water, and repeat the application for two or four nights, if necessary.

It may be wise to keep children, who are thus treated, within the house for a few days; but if they must go out on the following morning, wash the throat with cold water just before the patient leaves the house.

The water poultice should be cold in all cases in which inflammation may exist, but should be hot if ulceration or suppuration exists. A sore throat needs cold water, but suppuration needs hot—as the diseased throat of diphtheria, or scarlatina in abscesses.

A sponge poultice has some advantages above all others, and is made as follows: Make a flannel bag three inches wide, and as long as any given affection requires. Fill this bag with very small bits of sponge; then soak in hot or cold water, as the case may need. Cover the outside with layers of cotton-battening, and over this some waterproof material. This poultice is elastic, and may be kept constantly near the skin, and will keep the throat at a uniform temperature—a very important point in diphtheria and scarlatina, and all other maladies in which suppuration exists. Cold sponge poultices may be applied in the early stages of scarlatina and diphtheria to lessen the tendency to inflammation.—*Phrenological Journal*.

Chronic Alcoholism.

Two eminent physicians of Paris, Doctors Beaumetz and Andige, of Paris, have been studying the subject of chronic alcoholism during the three years past. All their numerous experiments were conducted on pigs, in order to determine the toxic powers of alcohol. It is thus that these gentlemen have been able to determine what amount of alcohol, proportionate to the weight of the body, suffices

to produce death by the gradual diminution of temperature. The more the alcohol departs from that prepared from wine, that is to say, grapes, the more it is noxious. Thus, the spirits prepared from leas, grain, beet root, potatoes, etc., are dangerous, as they contain greater quantities of deleterious substances. Each pig received over seven ounces of alcohol daily, and every time an animal was given more than a dose of the one-fiftieth part of an ounce per 2½ pounds of its weight, it lost appetite and became affected with drunkard's retchings. Post-mortem examination revealed that the digestive tube was intensely congested, but the liver appeared sound. However, the liver of the pig consists of a fibre of a most resisting nature. All the animals were attacked with lung congestion, due to the elimination of the alcohol by that organ, and the immobility of the animals when "drunk;" thus rendering them very susceptible of cold. It is important to note, great alterations ensue in the arteries, and especially in the aorta. The nervous system of the pig, which is so very different from that of man, was but little influenced by the alcoholic intoxication. Inebriety produced in the pigs stupor and sleep. In man the predominance of brain explains the cerebral effects of intoxication. The same proportions of pure origin alcohol produced relatively little effect; that from grains and roots was slow but certain poison. The doctors explain that a portion of the alcohol, in presence of the globules of blood, becomes changed into acetic acid, the latter unites to alkalies, forming carbonates after having been acetates, and finally disappear in the forms of carbonic acid and water.

Danger in Moldy Bread—Ergot.

A singular case of poisoning from eating a pudding made in part of moldy bread is reported in the *Sanitary Record*. The main facts of the case may be briefly stated as follows: The principal materials of the pudding consisted of scraps of bread left from making toast and sandwiches, and they had been about three weeks accumulating. To these scraps were added milk, eggs, sugar, currants and nutmeg. The whole was baked in a very slow oven, and was subsequently eaten by the cook, the proprietor of the eating house in which it was prepared, the children of the proprietor and two other persons. All of these became violently ill, with symptoms of irritant poisoning. One of the children (aged three years) and one of the adults died. The necropsy of the body of the child caused the medical men to suspect poisoning, and accordingly the viscera, together with the remnant of the pudding, the materials used in making it, the matter vomited, etc., were sent to a chemical analyst, Mr. Alfred Allen, for examination. He made tests for several poisons, but without positive result. A puppy was fed with the pudding for two days without any poisonous effect. He was then led to look for ergot in the pudding, and was soon startled to find unquestionable evidence of its presence, as far as the chemical reactions went, though he was unable, with the aid of the microscope, to detect any actual ergot. From these facts Mr. Allen infers that the reactions heretofore supposed to be peculiar to ergot are common to other poisonous fungi.

A DIPHTHERIA-INFECTED DOLL.—It may be remembered that a good deal of prominence was given last fall in the papers to the occurrence of diphtheria in a family in Amsterdam, New York. Two children died at intervals of several months, and a third was taken sick. The Board of Health appointed a committee to investigate, which examined the house and its surroundings, and obtained a statement from the attending physician. They have recently made their report, finding that there was no bad conditions existing in or about the house sufficient to explain the appearance of the disease, and they concluded that it came from a cat which was fondled by the child that first fell ill. This cat was found at the time to have a swollen throat and to be suffering from a discharge from the mouth and nostrils. It died a few days afterward. Three days after the death of the cat the child fell sick with malignant diphtheria and died in about a week. During its illness it played with a doll, which was afterward given to a younger child, as it was supposed to be properly fumigated with sulphur fumes. This child, shortly after being allowed to play with the doll, also fell ill with the diphtheria and died. The third child also played with the doll and fell ill, but recovered. The Board of Health, therefore, traces the re-appearance of the disease in the family, after the death of the first child, to the doll.—*Sanitary Engineer*.

INCREASED DURATION OF HUMAN LIFE.—Medical and other statisticians, who have given attention to vital statistics, have, after decades of observation, acknowledged that the duration of human life has been prolonged and the period of vigorous activity extended. In consequence of this increase in the expectation of life, corresponding alterations have been made by actuaries in the life insurance tables.

THE British Medical Journals say: "We often hear a great deal about the dampness of our climate as a cause of disease, of the respiratory organs especially, but the death rate and the amount of rainfall do not appear to stand in any definite relationship, whereas a spell of cold weather produces an immediate and notable effect."

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—Amador *Sentinel*, May 28: Said Alvinza Hayward the other day: Dr. Zeile was very liberal to W. F. Detert in offering him the Zeile mine for \$250,000—that is in agreeing to sell him the property for three or four times its value. Nevertheless we are inclined to the opinion that were Hayward offered the property at the same figures he would jump at the chance. The improvements above ground cost far more than the figure mentioned, and they are comparatively new, and the mine is paying. What better investment would Mr. Hayward desire for his surplus capital. Rock is now being taken out of the Modoc mine, in the Pioneer district, which prospects well, and another big crushing is anticipated. Things are quiet at the St. Julian. The mill is pounding away steadily on rock that is said to be paying expenses, though nothing of an extraordinary nature is reported. Judge Reed has his concentrator there and is confident that it will work satisfactorily. Now that W. A. Nevils has purchased the little ranch, it is said to be the intention of resuming operations on the mine thereon. This would be good news for Jackson, if a fact. Every pick struck between town and the river is an advantage to the place, more so than twice the amount of work expended in any other locality. We have another rich quartz discovery reported this week, one made in a mine owned by Messrs. Bartlett and James and John Petty, at Fort Ann, on Dry creek. From a reliable source we learn that the discovery is likely to rank with the richest ever made in the county. The ledge is two and a half ft. wide, and the softer portions of it are paying from \$1 to \$2.50 per pan. In this neighborhood rich float has been discovered for years, but this is the most extensive discovery ever made there. From this it will be seen that the eastern section of the county is waking up, and is determined to put in her claim for notoriety as a bonanza section.

GOVER.—Amador *Ledger*, May 28: It is now definitely settled that the Gover mine will start up shortly. Messrs. Call and Ashby—both officers of the company—were up lately, looking at the property and making arrangements for resumption. It is also understood that the Amador Canal Co. are identified with the enterprise. Work will be prosecuted through the new shaft, and it is believed that a pretty thorough exploration will be made. John Palmer and J. Wilds went up to the Acme mill last Tuesday, for the purpose of making a test run of rock from that quartz mine, the owners not being satisfied with the result of previous crushings. The South Spring Hill mill is running steadily, with prospects as flattering as ever. The North California Mining Co. have levied an assessment of 4 cents per share. Also changed the principal place of business from Sutter creek to Amador City. The face of the big tunnel at Middle Bar has passed during the week through a large body of quartz. It has not been assayed, but from appearances it is thought to be of paying character. Reports are current that another rich pocket has been struck in the upper tunnel of the Mammoth mine. We have not heard the particulars. The St. Julian mill was brought to a standstill Wednesday last for an indefinite period. The cause of this rather unexpected action is attributed to a lack of pay ore to keep it running. For several weeks past the mill has been running almost exclusively on slate, and experience has proved that this stuff is not so profusely freighted with gold to justify the running of a one-stamp mill at a cost of from \$5 to \$6 per ton in milling expenses. Work is being pushed ahead in the mine. It is intended to open up the mine and separate the pay rock from the rubbish, so that hereafter the mill, when in motion, will be kept at work on quartz that will be likely to yield a fair profit over running expenses. It requires ore that yields from \$8 to \$10 per ton, to leave any margin of profit in working with the present crushing facilities.

El Dorado.

TUNNEL.—Georgetown *Gazette*, May 28: The tunnel started by Gibbs & Hulbert a year ago last January to open up the Bright Hope mine at a depth of 175 feet is now in 236 feet. The tunnel runs southwesterly quartering across the slate, and has about 125 feet more to run before reaching under the 75 foot shaft with which connection will be made.

Inyo.

THE MAXIM MILL.—Inyo *Independent*, May 28: Wm. Hedge informed us yesterday that the mill was crushing away and working smoothly, doing better work than was expected. Mr. Hedge is of the opinion that the ore will pay handsomely. The rock-breaker met with a little accident, but will be ready for work again by to-night.

Mono.

GENERAL NOTES.—Homer Mining *Index*, May 28: Supt. Winterhalter arrived and put a force of men to work clearing the snow from the Gorilla tramway early this week, and it is believed this preliminary work will be completed to-day. Some repairs or alterations are necessary about the running gear of the tramway, but these will consume but two or three days. The Gorilla Company has secured one of Colonel A. E. Redstone's newly patented "Planet" quartz mills, which is expected here tomorrow. The mill is of five-tons capacity, and the experimental test of its efficiency will be made at the Lundy Reduction Works. If it should prove a success, two other mills of a similar kind and capacity will be ordered at once, and the three (with an aggregate capacity of 15 tons per day) will be put up at the foot of the company's tramway. The working force in the May Lundy mine is being increased as fast as supplies for the men can be got up to the boarding house, 16 additional men having been put on during the week. The first team or the tramway started up yesterday morning. The tramway was but slightly damaged by the heavy snows of the past winter, only about 90 ft. of it having been carried away. The mill has been thoroughly overhauled and put in excellent order, and is now running on concentrates. The additional five-stamps are looked for every day, but the mortar will be somewhat delayed. Penters' big teams are expected out on

Monday to begin hauling ore. Jonesburrow has been the scene of much activity during the current week, and as everything is now in readiness, the Virginia Creek Hydraulic Mining Company will turn the water into the giants on Monday. As the gravel fields of this company, lying subjacent to the \$8,000,000 diggings of Old Mono, are known, by the limited operations of last season, to be very rich, and water will be abundant throughout the present season, it is confidently expected that this company's shipments of gold dust will be steady and heavy till winter sets in. The working force in the Bryant mine was largely increased last Monday, it being understood that negotiations for a mill had taken such a favorable turn that success was assured. A large quantity of high grade ore will at once be taken from the 130 level, and held in readiness for the pack trains, which will be put on as soon as the trail down to the Lake canyon toll road is clear. D. E. Jones, of the Virginia creek hydraulic, thinks it quite probable that work will be resumed on the Detroit copper mines in Jordan district in the near future.

RUMORS.—Bodie *Free Press*, June 2: The atmosphere of Bodie is filled with stories of the different shapes in which the spring boom is to strike the camp. It is reported that the Noonday days are to be started up under the management of Wm. Irwin; that the Standard mine and mill are to start up immediately; that the Standard-Bulwer mill is to run to its full capacity on Bodie Con. ore; that the Bodie Tunnel mill is to run on its own ore. The powers that be are endeavoring to so arrange matters that the Standard-Bulwer mill will be put to work on Standard and Bodie ore—15 stamps to be used on each. Those who are familiar with the construction of this splendid mill know that the scheme is practicable, as the parallel batteries deliver the pulp to their respective tanks on opposite sides of the pan-room, and the work from end to end is as completely separate as though done in different mills. This will be a very economical arrangement, as it is well known here that ore can be reduced at less cost in this mill than in any other in the district. If this change goes into effect it will let out the Standard, Bodie-tunnel and Bodie mills. We are assured, however, that the Bodie Tunnel Co. has enough good ore to keep their own mill running, and if the Bodie lease is not renewed they will resume work on their own ore. With the Bulwer-Standard, Bodie Tunnel and Syndicate mills running on good ore, the little mills working on tailings down the canyon, and the almost assured success of Gov. Bladell's enterprise at Del Monte, the outlook for the summer's work is not so very discouraging, even though the Noonday stories should prove unfounded.

BODIE CON.—Upraise No. 1 has gained 6 ft. during the past week; total height, 225 ft. Upraise No. 4, 300-foot level, has gained 7 ft; total height, 75 ft. A drift north from bottom of upraise, which was started on the 28th ultimo, is in 9 ft. A drift south from upraise No. 1, also started on the 28th ultimo, is in 8 ft. There were crushed at the Bodie Con. mill 110 tons of ore, and at the Bodie Tunnel mill, 332 tons. The average assay of the pulp was \$23.51, and of the tailings, \$2.97.

BODIE TUNNEL.—The north drift on vein, 200-foot level, was advanced 19 ft. The vein in the face is 2 ft wide.

Nevada.

RICH STRIKE IN THE CHAMPION MINE.—*Transcript*, June 1: The new shaft on the Champion mining property, commenced about six months ago, has attained a depth of 200 ft. From this point drifts were run north and south. The workmen in the north drift, after running 13 ft, came upon a fine clute of sulphureted ore on Thursday last, which is two ft in thickness and which, those who have seen it and pretend to know say, is rich as any taken from the Nevada City mine. The owners are in high glee over their rich strike, which appears to be permanent, and if so will pay them for the immense outlay involved during the past nine years that they have been prospecting the claim. We trust that it may prove a bonanza, and that the mine may be justly called, as its name predicts, the Champion.

NEW YORK HILL MINE.—*Foot-hill Tiding*, June 3: Some extra good ore is coming from the New York Hill mine, and gives great promise of the mine yielding largely in the near future. Several days since some rock was taken from the No. 10 drift north, and paid \$400 per load, and on Saturday a ledge was blasted open, in the No. 11 drift north, which just glistened with its golden treasure.

ENJOINING HYDRAULIC MINES.—Nevada *Transcript*, June 3: United States Marshal Drew arrived at Dutch Flat Monday and served injunction papers on Phil. Nichols, who owns a small hydraulic claim there, and S. Wheeler, Supt. of the Little York and Liberty Hill claims. The plaintiff in this case is a resident of Germany who owns some land along Bear River above Wheatland, and all the hydraulic mines from Quaker Hill down to Dutch Flat have been included in the complaint. A telephone message received from Chalk Bluff yesterday stated that the Marshal was there on his way to Quaker Hill.

Plumas.

QUARTZ DISCOVERY.—Greenville *Bulletin*, May 28: There has been considerable excitement in town during the past few days concerning a new quartz ledge discovered near the Round valley reservoir. The discovery was made on the 19th inst. and the lucky owners are Joe Rowett, foreman of the Sun Set, now in successful operation, John McIntyre and Sol Johnson. The location lies northwest of the Round valley reservoir dam, and nearly west of the John Ellis claim, which was worked in early days and yielded its owner rich returns. The owners of this new find consider it an extension of that famous lode, and think they have a genuine bonanza. The vein runs nearly east and west, and has been uncovered at intervals for nearly 600 ft, showing a width of from three to ten ft. The quartz prospects the entire length and it is estimated that it will pay \$10 or \$12 per ton. The ore is fragile, of a rosy appearance, and easily removed with pick and shovel. A tunnel is now being run, which will tap the ledge within two weeks at a depth of 55 ft. If at that depth, the quality of the rock proves equal to the croppings, the find will be of great value. The location of the ledge is most excellent for cheap working. With less than 200 ft of tunnel backs of 150 ft may be had. By hauling the rock less than half a mile excellent water may be had just below the dam of the Round valley reservoir. All of the owners are old miners, men who understand the na-

ture of a mine and the value of quartz. It is a ledge that poor men can work. An extension, named the Gore claim, has been located by John McIntyre. It joins the Forest King or the east and the Ellis & Davis claim on the west. It is reported that the Halstead mine is looking better than ever. The ledge is very wide and prospects well all through. It bids fair to be one of the best mines in the State. The Gold Stripe mill will soon be in operation. The Supt. Geo. Standart, is busy getting things ready. By Monday 12 stamps will be running. Work in the Riverdale mine, near Quincy, is progressing finely. Mr. Russell is as busy as ever and looks after things with his usual energy. A. Dragovich has been in this section several days past looking at mining properties. He represents capital looking for investment.

LORING AND LEAVITT'S MINE.—*Plumas National*, May 28: Last Tuesday we dropped in on this mine, and found them hard at work getting their new shaft started, and it was then down about twelve ft. The machinery from the old shaft has been cleaned up and moved to the new location and seems to work smoothly and well. The foundation timbers are large and massive, and everything about the new works seems substantial. A small steam pump is now used when any water troubles the shafters, and as soon as depth is gained its place will be taken by an 8-inch Garrett Gas Pipe pump, which has just arrived from below, and is ready to put in. It is a fine pump, and should do good work. The shaft is 4x7 ft in the clear, and a partition divides it into two compartments—one for the bucket and the other for the pump. It will be heavily timbered, and tightly lined to keep out the water. It is close to 100 ft to headrock. Mr. Wm. Melike, who has full charge of the shaft, is the man for the place, and if he don't put it down rapidly and well, nobody can. Fifteen or twenty men are employed by the company, and the work of sinking goes on day and night. The new shaft is close down to the Riverdale line, and all the Loring & Leavitt ground can be worked from it. The owners are confident that they have several hundred feet of very rich ground, and they are making every arrangement with a view to permanency.

San Bernardino.

CALICO.—*Print*, May 31: The news in Calico is slack this week. Work is progressing quietly on the various mines and developments are being made as usual but nothing of a startling nature is noted. The Escheque has as large a showing of ore as any prospect in the camp and there is every indication of its becoming a good mine. The ore so far is running from \$80 to \$300 per ton. Mr. Brisson one of the owners says that he will commence shipping ore about July 1st but at present does not know to which point until he ascertains where the cheapest milling can be done. The Bismarck is looking well and the work of development going forward as usual. The same may be said of the Humbug. The parties who are chloriding on the Occidental grounds are mostly making money.

BONANZA KING.—The Bonanza King mine of Providence mountain, has paid a \$25,000 dividend for April last. This makes \$75,000 for the last three months. Some of the Los Angeles stockholders feel very comfortable at the way this royal mine is panning out.

Sierra.

A MAMMOTH LEDGE.—*Sierra Tribune*, May 28: The Mammoth quartz ledge is located one-quarter of a mile east of Brandy City and is owned by John J. Williams. The ledge is probably the most extensive in the country, averaging about 250 ft in width. Assays of the ore give good returns in gold. It also contains silver, nickel and copper. Mr. Williams had about completed arrangements with a party of eastern capitalists to develop his property in lieu of a one-half interest in it, when, owing to disastrous investments elsewhere, much to their regret, were compelled to abandon the project. It is the intention of the owner to go ahead and open up the mine as rapidly as his means will permit of. The mine is so situated that sufficient water to run any number of stamps can readily be obtained from Cherokee creek.

THE JIM CROW QUARTZ MINE.—The above named quartz mine is located one mile and a quarter above the mouth of the Jim Crow canyon. R. D. Williams, one of the owners, was down from there Sunday and informed a *Tribune* reporter that the Company proposed to drive work at the mine this summer. The vein is between five and six ft in width on the surface and the ore taken therefrom yielded handsomely. A tunnel has been run into the hill 240 ft and it will be run ahead until it taps the ledge. More work is being carried on in this quiet way among the quartz ledges throughout the county than most people have any idea of.

HARD ROCK.—J. T. Mason and Cap. Wilburn were down from the Red Oak claim last week. They report about eight ft of snow at that place. The tunnel is in 240 ft. The rock is very hard at present, and costs something over \$24 per foot to get through it. Indications are very favorable for striking softer rock soon.

GOLD LAKE.—*Mountain-Messenger*, May 31: Dick Wade came down from Gold Lake Thursday, on snowshoes to Gold Lake, and thence afoot to Downville. He reports Philo Haven with two men busy washing at his diggings. L. Foss' flume is filled with frozen snow which thus far it has been impossible to clear out. The Four Hill Quartz Mining Co. are using water from their tunnel. D. Steilman is at his mine, three and one-half miles from the Lake, and will continue work this year at his claim. John McDonald was over from Ballarat claim, last week. The tunnel is in top gravel and they are expecting the bedrock to come up as they go ahead. The top gravel prospects.

Siskiyou.

EMPIRE.—*Yreka Union*, May 31: At the Empire mine they have been taking out rock for some six weeks past, but it is only until recently that they struck ore which would pay. They are now running on a good, fair ledge, and the rock prospects very fairly.

Trinity.

LUCKY PICK UP.—*Trinity Journal*, May 30: In coming to town the other day, J. Kellogg of Hay Fork espied what he thought to be a piece of gold in the red dirt by the roadside, near the summit of the Brown's creek mountain. His traveling companion pronounced it a leaf, but Jack was not satisfied with this judgement and on dismounting picked

up a pretty nugget weighing \$23.75. When pieces of this kind are found in the soil on the top of our mountain ranges, who shall say that Trinity has not thousands of acres of auriferous earth which has not yet been prospected? We opine more gold exists where Mr. Kellogg found this piece.

NEVADA.

Washoe District.

ALTA.—*Enterprise*, May 31: Drifting west, along the diamond drill hole, on the 2150 level. The rock is pretty hard, but very good headway is making in the drift. It is now out beyond the wet streak in which the diamond was started; there will be no trouble with water, as none was found by the drill. The diamond drill has been set up at the face of the east drift on the 2150 level.

BEST AND BELCHER.—The east crosscut on the 1200 level, 125 ft south of the Con. Virginia line, is showing quartz of a favorable character, though it carries but little metal as yet. On the 2700 level work has been discontinued, owing to a flow of water that causes intense heat, and the men have been brought up to the 2500 level and put to work at running a northwest drift at that point in a section of unexplored ground.

HALE AND NORCROSS.—Have begun shipping ore from the 200 level to the Mexican mill on the Carson river, where a crushing of 1,000 tons will presently be made. On the 2800 level are easing timbers at and about the station. No work is being done on this level at the points where ore was found.

BELCHER.—The miners have been laid off for a few days on account of the flood in the Carson river causing sufficient back water to interfere with the working of the wheels of the water mills. However, the water has receded, and the men were to resume work in the lower levels last evening.

IMPERIAL.—The lateral drift is in Alpha ground. It has encountered a great deal of quartz, but this has as yet yielded no assays of much value. As this quartz is of a very favorable character, it is hoped that it will somewhere be found to carry ore.

CALIFORNIA.—The usual progress is making in the east drift on the 2900 level. The repairs to the C. and C. joint shaft are still continued. The ground passed through is a mixture of quartz, clay and porphyry.

YELLOW JACKET.—The boilers from the works at the new shaft have been brought to the works at Gold Hill, and are being set up in place of the old ones. Pending this change the miners have been laid off.

UNION CON.—Are drifting in east crosscut No. 4. There is some water in the drift, but not sufficient to prevent going forward with it. The ground is a mixture of clay, quartz and porphyry.

CON. VIRGINIA.—The east drift on the 2900 level has been extended about 30 ft. Are still repairing the C. and C. joint shaft. The material encountered in the drift is the usual vein porphyry.

SIERRA NEVADA.—The north drift on the 3100 level has passed through the dyke or crosscourse of porphyry, and is now in vein porphyry, the appearance of which improves as the drift is advanced.

OPHIR.—Are still finding some low grade ore in the filling of the old drifts and other openings on the 250 level. The ore extracted is being worked at the Morgan mill on the Carson river.

UTAH.—The south drift on the 1950 level has been advanced about 35 ft this week, and has improved in appearance, more quartz being found than heretofore.

MEXICAN.—The winze on the 3100 level was yesterday within 15 ft of the 3200 level. The bottom shows porphyry, clay and quartz.

COMBINATION SHAFT.—Are making good headway in cutting out the bob-station at the 2900 level and in making the other necessary openings.

ANDES.—Some low grade ore is being extracted and a good deal of work done in the way of exploring and prospecting.

UNION SHAFT.—Are repairing the drain drift on the 1600 level. This drift leads out to the north branch of the Suto tunnel.

GOULD AND CURRY.—Two east crosscuts are being run on the 1200 level, in ground that promises well.

CROWN POINT.—What is said about operations in the Belcher is equally applicable to this mine.

SAVAGE.—The bulkhead in the north drift on the 2600 level will be finished by next Monday.

SCORPION.—The west drift on the 500 level is still in vein material of a favorable character.

CHOLLAR.—Are preparing to place a stone bulkhead in the drift on the 2600 level.

Bristol District.

BULLION.—*Pioche Record*, May 28: The output of bullion from the furnace during the week has averaged 80 bars per twenty-four hours. This must be highly satisfactory to the Day Company. The screenings being hoisted from the Gold Ledge mine contain a large quantity of big chunks of rich ore. We noticed that the ore is of high grade, such as was taken out in early days. In those days the miners were not particular and they would scatter good ore in all directions. It will come in good now though. If the men had only been aware of it, they could have made big money chloriding in the screenings east side.

Bromide District.

THE MINES.—*Cor. Calico Print*, May 31: This district is in Nye Co., Nevada. The mines upon which we have been for the past three months at work are situated in a low detached range of mountains a short distance east of the Death Valley or Grape Vine range of mountains and about 25 miles easterly from W. T. Coleman & Co.'s Borax Works at Furnace Creek in Death Valley, and are laid down on Wheeler's maps as the Bald mountains, and by the recent road about 150 miles northeast of Daggett on the S. P. R. R., and about the same distance southeast of the southern terminus of the Carson & Colorado narrow gauge railroad at Owens lake. Both of the railroads are accessible by wagon roads as good as are common in this southern country. The mineral is found in a soft formation of white or marble lime, easily mined, extending northerly and southerly about fifteen miles; the country rock on

the east side of this lime belt is quartzite, and on the west slate, and at many places throughout the entire distance rich silver bearing rock has been found, but as yet little work has been done, in fact none of consequence, except that done lately by our party, and upon the claims owned by Wm. L. Stockton; but for what has been done I will venture the assertion that no better showing can be made in any mining country, both as to quality and quantity of ore. A brief description of the U. S. mine, of which our company are the owners, and upon which most of our development has been done, and which will describe the general characteristics of the whole, will give your readers a fair idea of the merits of the country. This ledge upon which we are now down about 40 ft, although through some considerably rich float rock, was entered at the surface by two crevices, respectively four and seven inches in width, the one on the hanging wall being the largest. For fifteen ft the ledge was badly broken but constantly growing in strength, a perfect foot-wall having been found from the surface, with hanging wall somewhat broken, but at this fifteen ft depth the vein matter became more solid, carrying mineral the whole width of nine ft, the distance between the two walls, the ledge pitching at an angle of about 60 degrees, which it has maintained to its present depth, the ore assaying from 60 to 200 ounces silver per ton, and steadily increasing in amount of rich ore, more black metal, chlorides, and some green horn silver being obtained. In the adjoining vicinity we have seven locations, all showing the same general surface characteristics as this one I have described. About three miles to the north and on the same belt and with the same rich mineral surface indications, Mr. Stockton has the Lady Ellen and two other promising locations upon which work of development with exceedingly flattering prospects is now being done. All of these mines are easy of access, being close to the valley. No expensive roads to build, being at an altitude of about 3,500 ft above sea level. No snow and no exceedingly hot weather, they can be worked throughout the whole year. Water can be obtained in large quantities by sinking in the bed of the Armarosa river which is but a short distance from the mines, or can be piped from the many springs which form the head of the river, while plenty of nut pine wood is just across the valley in the Grape Vine range. There are many other good mines here, and a splendid field for prospecting.

Columbus District.

MOUNT DIABLO.—*True fissure*, May 31: The west intermediate from winze No. 5 is in 32 ft and the ground looks more favorable for ore. The upraise from the east drift from the same winze shows some \$70 ore. Winze No. 6 is down 100 ft, the east drift from the north crosscut, on the third level, shows a few inches of \$80 ore, and this drift is now 60 ft long. The intermediate, between the second and third levels and west of the shaft, is in 33 ft and shows a strong ledge of \$25 ore. The south crosscut from the east drift on the second level has been stopped, after reaching a length of 233 ft, and a raise has been started from the same to connect with the east drift on the first level. The east drift on the second level shows some 15 inches of \$90 ore. The north crosscut from the west drift on the first level is in 43 ft. A small amount of \$50 ore is being taken from the upraise from the east drift on the first level. The sinking of the incline has been stopped for the present, and timbers are being put in from the third to the fourth level, and an excavation is being made for a chute on the fourth level.

COLUMBUS CON.—*Crosscut No. 3*, from the main drift on the 150 level, was extended four ft during the week, and is now about 48 ft in length. The ground is gradually changing from a hard formation to that of an easy working one. The upraise on the streak of ore encountered in the south crosscut from the same level is now up a distance of 25 ft and is about 15 ft in width at the top. The width of the ore vein is about two and a half ft, and gives assay ranging from \$35 to \$60 per ton. The ore is black manganese in character and is deceptive. It is difficult to arrive at the average of its assay value per ton. All the other levels in the mine are now ready for further prospecting, which will be resumed in a short time. At present no work is being done except on the level mentioned.

Esmeralda District.

MILL.—*Bodie Free Press*, June 3: Ex-Governor Bladell, of Nevada, came in from Del Monte station this morning. He says the 20-stamp mill will be ready to start up on full work by Monday or Tuesday certain. The Governor speaks with much hopefulness of the prospects of the old camp and the success of the present run. The mill is in splendid order.

Tuscarora District.

GOLD PROSPECTS.—*Times-Review*, June 28: Within the last few days, Joseph Miller and George Phillips have been prospecting at the head of Eureka Gulch. On Thursday they run a little cut in the side of the hill and struck some rich decomposed quartz which shows to the naked eye a considerable quantity of free gold. The extent or value of the find cannot be even conjectured at present, as sufficient work has not been done to develop the size of the body or vein, or in fact whether it is a ledge or not. It is admitted, however, by all who have visited the place that it is a most encouraging prospect. Several shovelfuls of the decomposed quartz which were panned out yesterday, averaged ten cents to the shovelful. The prospectors ascertained after they had made the location that it was on the "Accidental" location, owned by the Beard brothers and George J. Smith. Arrangements will, however, doubtless be made whereby the discoverers will have an equal share with the locators in the claim. A thorough prospecting of the quartz body will be commenced in a few days.

ARIZONA.

THE BLACK HILLS.—*Miner*, May 23: From Governor Tritle who returned yesterday from the United Verde Copper mines, at Jerome, we to-day learned that the company's furnaces are again running, and turning out a steady stream of high grade silver bullion. The difficulty in obtaining coke has been entirely overcome by the construction of a new road, and at present there is in the vicinity of Sander's station alone, 150 tons, an amount sufficient to run the smelter a week. On the morning the Governor left Jerome ore was discovered in a drift

leading from the Hampton shaft, —150 ft in depth,—toward the Eureka mine. This ensures the 300 ft of ore from the drift to the surface where were found the outcroppings of Eureka ore. There were also found a few ft above the level of the old, another large and unexpected body of high-grade silver ore. On the return trip from the mine, the Governor in company with President McDonald, Dr. Unsell and Wm. Adams, Jr., all large owners in the Company, examined the road from Baker's ranch to the Pines,—the road proposed for a station for the Black Hills, on the contemplated Central Arizona Railway. The party found that the proposed-railroad would reduce the freighting by teams to fifteen miles.

PRESCOTT MINES.—*Courier*, May 28: Just now we can boast of the Hosoris, the United Verde, the Lane, the Silver Belt, the Chicago, of Groom creek, Jack Lawler's mine, In Agua Fria, the Chase group, the Kimball, the Holmes, the Pine Spring, mines in Humburg and Bradshaw Basin districts, besides eight or ten other properties, scattered throughout the country all of which are in condition to yield plenty of precious metals. Mr. Clark, Superintendent of the Chicago mill and mine has received returns from concentrations shipped for him to Pueblo, by the First National bank of Prescott, and is satisfied with the yield, which was about one hundred dollars per ton, over and above all expenses. He is now pumping water out of Chicago mine, and will start mill in about a week.

THE BENSON SMELTER.—*Star*, May 28: Few people, other than those directly interested are aware of the immense importance of the Benson smelter as a developer of the mineral resources of this territory. In its interest mines are worked and ore shipped from all sections of the country. Even far off Mohave sends its contributions, the ore from that section being shipped by way of Kingman, across the Colorado at the Needles, then around by Mohave and the Southern Pacific to Benson. The company receive on an average about five car loads of ore, coke and flux daily, and produce about 75 tons of bullion of an average value of \$500 per ton. Considerable ore is also received and worked from Sonora, most of the shippers from that country send rich rock. The company own and work several mines in the neighborhood of Harshaw. They employ, all told, about 200 men, own most of the teams in their employ. It is reported that they propose shortly to put up a stack for the exclusive working of copper ores.

COLORADO.

NEW TRAMWAY.—*Colorado Miner*, May 28: The new tramway from the Pay Rock mine to the mill has been successfully started up. The Pay Rock tramway, finished and worked for the first time last Monday, is the Huson patent, endless, wire-rope tram, and travels over grooved wheels secured to the cross-arms of elevated supports. The buckets used for carrying the ore are fastened firmly to wire rope by means of clamps, and attached to wire rods. There are forty-two of these buckets on the Pay Rock tram, and carry about 150 pounds of ore each. The Pay Rock mine is a bonanza—systematically, economically worked. Its miles of drifts, cross-cuts, shafts and stopes have produced their hundreds of thousands of dollars, and are still energetically worked with paying results. The crevice in the Pay Rock must be over 100 ft wide. The new strike recently made in No. 3 tunnel level is still producing fine ore, and increasing in size. The width of the streak is now over eight inches, and will run 800 ounces per ton. Hundreds of tons of concentrating ore are being taken from the dumps and will be sent to the mill as fast as the tram can move it. In the breast of the main drift, over 900 ft from the surface, the pay streak of concentrating stuff is over three ft wide. The mill, known as the Pay Rock concentrator, is situated on the north bank of the creek at the foot of Republican mountain, and a short distance this side of Silver Plume.

IDAHO.

OUNCE DIGGINGS IN ALDER GULCH.—*Cour d'Alene Pioneer*, May 24: Of all the many side gulches of Pritchard creek that have won fame for the Cour d'Alenes, Alder, like its historical namesake, is in the van. The developments during the past two weeks bring this gulch to the foremost rank among the gold producers and leaves no doubt that it is one of the richest little gulches that has ever been trod by the patient gold-hunter. The character of the wash is distinctively gold-bearing, and the prospects in every instance justify its claim as the banner side gulch of the camp. Alder creek debouches into Pritchard from the north, at the west end of the town of Murray. It is less than a claim wide, three and a half miles long, and is thickly timbered for its entire length. About one-quarter mile from its mouth it forks into two branches, and on the main creek, and these forks ten acre claims have been staked which cover the entire bottom. During the average season the creek carries 700 miners' inches of water, which with proper handling is sufficient to work every claim the entire season. Its sources are in the everlasting snows of Bitter Root range, and the fall is ample for 12 ft boxes and convenient for full tailed races.

MAIN CREEK.—On the main creek, W. L. James, James Travis, Dennis Rodner, John Doctor and Charles Cottle own No. 1, the Heart mining claim. It adjoins the Ives' claim on Pritchard gulch, and occupies a portion of the Murray townsite. On the Heart claim a drain is walled and timbered for a distance of 250 ft, at the end of which a drift extends 50 ft. Twenty ft of gravel is over this drift and it prospects throughout. Streaks of clay peatmate the gravel in many places, and gold is found deposited in them in coarse colors. The drain is but a short distance from bedrock, and before our next issue sluices will be running on this claim. No. 2 has lately passed into the control of Alexander Christian & Co., who hold deeds in escrow for four-fifths of the property. Considerable work has been done on this claim, an open drain being run 300 ft and 18 ft in the ground. A blind drain has been begun on No. 1, which is calculated to tap bedrock at the lower end of the claim. It is in 100 ft. No. 3 is owned by Baker, Scott & Co., who have been steadily at work for the past two months opening up the gravel. Six men are at work on the claim, and an open drain has been run 300 ft and 30 ft drifted in the gravel. No 4 has seven men at work running a large open drain, 10 ft wide. It will give a good

opportunity to prospect the bedrock, an area of 100 300 ft being exposed at one time. The gravel prospects well.

RIGHT-HAND FORK.—The northeast fork runs around a butte which closely divides the waters of Alder from those of Gold Run. On No. 1 a great amount of work has been done. The firm of Campbell, Pease & Co., and Messrs. Chew, Dugan & Holman are the owners. Three hundred ft of a drain is run, and one set of sluices is running. Six men are at work, who take out daily from the bedrock three to five ounces. When bedrock is reached by the main drain, the output will average over an ounce per ton to the man. No. 2 is being worked by John McClair & Co. They are on bedrock with the drain, and have a long string of sluices running. Six men are working on the bedrock, and on no one day has their clean-up been less than seven ounces of dust. No. 3 is owned by C. H. Hough, P. R. Haysington and R. Pruet. They are running one string of boxes, and their daily runs are open to inspection. It is over an ounce per day to the man, and the gold will average coarser than any yet found in the country. In their last clean-up, but few pieces weighed less than 10 cents, while most of it were nuggets from 50 cents to \$5. They have a bedrock drain 175 ft long. Last Thursday a streak of blue gravel was struck on this claim, which has produced quite a commotion along the creek. It has the appearance of marl, and is absolutely the richest pay streak yet found. It lays on the bedrock, and is ten inches thick. This streak is composed of fine tight gravel, which is held in a blue clay matrix, and is peculiarly adapted to sifting fine gold. It is, accordingly, found to contain fine particles of the metal, which is plentifully distributed throughout the gravel. The claims above and below are on to the strike, as it doubtless runs on their ground. On the northwest fork a great deal of development work is going on which will be appreciated when the sluices are running. The ground here prospects fully as well as the other fork, and the bedrock, when it is finally reached, will show prospects equally rich. Messrs. Hall & Co. have transferred a hill-claim between Nugget and Buckskin gulches to Eastern parties for \$6,000. The hydraulic is running again, and the ditch from Alder creek completed. It is the longest ditch yet constructed in the country, measuring in its windings 2½ miles. It carries at present 300 miners' inches of water, and is capable of running 500 inches. The hydraulic now has a 75-foot fall, with a 1½ inch nozzle. Twenty four men are at work, and the output will no doubt revive the interest felt in the pioneer side gulch of the camp. The first clean-up will be made to-morrow.

DEEP GRAVEL.—The *Pioneer* in its first issue called attention to the fact that one of the greatest gold-bearing gravel deposits ever discovered could be found on the north side of Pritchard creek, and the developments of the past week shows that this deposit is astonishingly rich. Gold is found throughout the gravel and pan prospects vary from 50 cents to \$3.00. The deposit varies from 10 to 150 ft in depth, and at Butte has a bed-rock on the high rim-rock of the present creek. The gold is of a solid rusty cast and has every evidence of being an ancient deposit. The river evidently occupies an extensive bed, and its course was doubtless opposite to the present flow of Pritchard creek. It is quite likely that at one time its waters ran through the pass on the Thompson trail and emptied into the Clark's fork of the Columbia river.

RAVEN CITY.—New discoveries of quartz are being made every day. The snow is rapidly disappearing and the claims are getting into shape for the season's run. Cement gulch, the knowing ones claim, will be the banner dust-producer of the camp. The bed-rock has not yet been reached, but the top layer of conglomerate prospects very richly. Bear and Granite gulches are producing their quotas of dust. The output is steadily increasing. Several large nuggets from these gulches were exhibited in town during the past week. An immense galena lode was discovered just as we go to press, which both in magnitude and richness outranks anything hitherto found. The "Houdan" ledge, discovered a short time ago on Vendetta creek by H. S. Bach, is pronounced by experts as good as the Mother lode.

THE NARROW GAUGE GROUP.—It will be remembered that last winter the Narrow Gauge concentrating works were covered by a snowslide, but it was impossible, owing to the snow, to ascertain the damage. The snow has now disappeared or been removed, and the damage is not as great as was at first anticipated. A few days' work will suffice to place them in good repair, and with good roads the works can be started up again within two weeks, and the shipments of ore resumed. An attempt was made to get a first load of ore through to Deer creek a few days ago, but it had to be abandoned, as the snow in the gulch was still too deep.

MONTANA.

BOULDER DISTRICT.—*Cor. New Northwest*, June 28: Mr. Thomas Conch, representing the Princeton Mining Co., commenced operations here on the 8th inst., with a force of men on the Princeton and Saranac mines. Owing to a rush of water in the main shaft at the Princeton, Mr. Couch has put most of his miners on the east and west ends of the Princeton. In the east shaft a drift is being run along the vein at about 40 ft from the surface. Sinking is progressing on the shaft west of the main. Saranac is situated south of the Princeton. Sinking on the Saranac is the order of the day, with two shifts on. I saw some very fine ore dumped from the bucket at this mine yesterday. Messrs. Cunningham and Gallagher are owners of the Morse mine, an extension of the Saranac. They are also developing this property. All that can be said with a certainty concerning the Princeton mine and the leads in this mining district, is that the work thus far done warrants the belief that the ore deposit here is a large one. There are now between 60 and 75 men in this camp. In the town considerable improvement is going on in the way of building, clearing lots, etc.

PHILLIPSBURG.—*Cor. New Northwest*, May 28: Supt. Perkins of the Hope and Granite Mining companies, is still absent and nothing is known as to the intentions of the directors of the last named corporation regarding the construction of a milling plant here during the coming summer. The Hope mill, with new batteries and tanks, machinery thoroughly overhauled and refitted, will start up

within the next two weeks on a long and steady run. Capt. Plaisted has placed in this mill the finest battery ever constructed in Montana. Rumor hath it that J. K. Pardee, of the Algonquin Company, has received instructions from Philadelphia to pump out the Algonquin mine. Hoisting machinery for the Princeton mine is being unloaded at the shaft. I think a large amount of work will be done on this property during the summer and fall.

NEW MEXICO.

NOTES.—*Cor. Lake Valley Herald*, May 20: The Kingston smelter will "blow in" again in a few days. Dry washers are now being used with good success in the Hillsboro placers. There is some prospect that work will be commenced again on the mines at Shakespear and Leitendorf very soon. The iron mines near Santa Rita are shipping about fourteen carloads of ore every week. The ore is used for flux by the Deming and Benson smelters. The Sundown mine, in the extreme southwestern part of Grant county, about 125 miles from this city, has been bonded for \$40,000 to Lake Valley parties. A shipment of ore was recently made by John Moore from the Pennsylvania, adjoining the Carlisle mine in Steele Rock district, which gave a return of \$136 per ton. W. P. Linder has purchased a one-fourth interest in the New Year's Gift mine, in Gold Gulch. He is a forty-niner, and understands gold mining thoroughly. He will leave for the East in a few days for the purpose of organizing a company with sufficient capital to put in the necessary machinery to work the property on an extensive scale.

CLIFTON.—From what I had heard of Clifton, I thought it would be a good point for prospectors and fortune hunters, and a pleasant place to make a home, but upon arrival there I was greatly disappointed. The place had been greatly overrated to me. There is considerable work going on at the present time, but I was never in a place where one is compelled to put up with so many inconveniences. For instance, wages are not so good as in the average Grant county camp, running from \$1 to \$3 per day. Board costs \$7 per week, with no choice of boarding houses, as there is but one at each mine, and the mines are about eight miles from town. The men are crowded together, nor can they do any better by batching, for it is a burning, blistering country, wood costing \$8 per cord and water \$2 per barrel, so I was told by men living there. The water has to be hauled twelve miles to the mines. The Longfellow is eight miles from the river which is the nearest water. The mines are on the very peaks of the highest mountains, which are one continual series of bluffs, chasms and precipices, the formation being porphyry, quartzite and limestone, underlaid with feldspathic micaceous granite.

ORGAN.—*Rio Grande Republican*, May 31: The smelter blows in again to-morrow on Memphis ore. U. G. Johnson has struck finer ore than ever on the Silver Star. Capt. Crouch is hauling ore from the Stephenson mine to the smelter. There are 47 tons now in the yard. The Girard has over 30 tons on the dump, which will be hauled in at once, and more will be taken out as work progresses. The Crescent City has 40 tons of ore at the smelter, 33 tons more at the base of Little Buck mountain, and new ore will be taken out at once. Col. J. S. Crawford has gone to Pueblo with several carloads of Silver Gem ore. The average returns of shipments from this mine are from \$100 to \$225 per ton. The smelter, which has been at a standstill for a few days since the fall of the flooring, will start up again to-day or to-morrow. Forty tons of ore a day is about the average consumption. Meadows is getting out large quantities of iron ore from the Merrimac, some of which carries silver, and some runs well in gold. It is also needed at the smelter for flux, and will be brought in soon. A great deal of native copper is being taken from the Memphis, and is so common in the output of that mine as to attract no notice. A wheelbarrowful passed us as we were examining the dump yesterday, from which we grabbed a small but fine specimen. Work will now go on in many different properties on both sides of the range. Claims which have mineral that can be treated at a profit at the Organ smelter will be developed. Many others will change hands, for so far all our good prospects have improved under the work done on them. Only last week Mr. Hamton sold a sixth interest in the Birthday, after having done some work for which he was well paid, for more than the whole mine would have brought before the work was done on it.

UTAH.

ONTARIO.—*Southern Utah Times*, May 28: Great interest is being taken in the opening of the new 900 level on the Ontario. If it shall prove as much of an improvement over the 800 as the new levels have averaged, it will give a noble future to the mine. Horn Silver stock is quoted firm at \$6, and the high intrinsic worth of its shares was practically proven by its slight fluctuation during the recent crisis. Its eighth level is reported as opening up wonderfully well. Their new hoisting works will, when completed, be the most perfect in Utah and a credit to any mine. In this connection, it is but just to say that praise is due to Supt. Hall, whose careful, judicious management, both of underground and surface work, cannot but commend itself to his company. In addition to this fact, it may also be said that his independent, gentlemanly bearing has won for him the friendship of the camp. Most satisfactory results are being effected at the Rattler mine in the Carbonate camp, under the common-sense superintendence of Mr. John A. Kirby. Manager Bigelow is quoted as having reported more efficient and profitable work, with the present small force, than was produced at any time under the W. W. Clark mismanagement.

SANDSTONE DISTRICT.—*Salt Lake Chronicle*, May 28: A fine specimen of ore from the claim of Dr. Standart, in the Sandstone district of Lower Crossing, has just been received by that gentleman. In appearance it is very similar to the rock in some of the Silver Reef mines, and carries both silver and copper. Assays show 70 ounces silver and 8 per cent copper. This is from a four-foot vein, and it is the intention to make a shipment shortly and have the value of the ore thoroughly tested.

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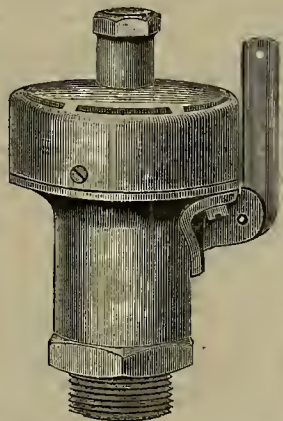
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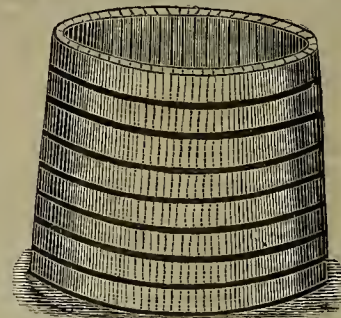
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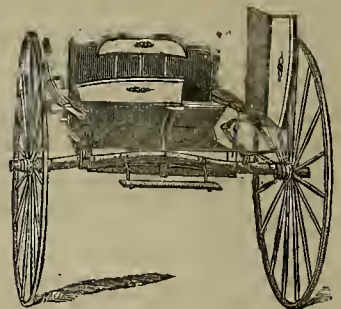
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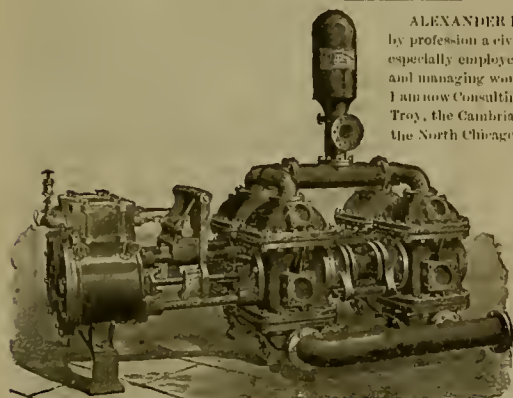
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ASSESSMENTS.

COMPANY.	LOCATION.	No. AM'T.	LEVIED.	DELING'N'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Adams S Co.	Nevada.	24.	25.	Apr 16.	May 19.	J. B. Burris.	369 Montgomery st.
Argenta M Co.	Nevada.	11.	10.	Apr 16.	May 20.	J. E. M. Hall.	327 Pine st.
Best & Belcher M Co.	Nevada.	23.	50.	Apr 15.	May 21.	W. Willis.	309 Montgomery st.
Belmont M Co.	Nevada.	37.	15.	May 26.	June 30.	J. W. Pew.	310 Pine st.
Bullion M Co.	Nevada.	29.	25.	May 19.	June 20.	J. M. Brazell.	328 Montgomery st.
California M Co.	Nevada.	12.	10.	Apr 16.	May 20.	J. E. M. Hall.	327 Pine st.
California M Co.	Nevada.	12.	20.	May 20.	June 27.	J. A. C. P. Gordon.	309 Montgomery st.
Cueva Santa M Co.	Mexico.	2.	10.	May 19.	June 21.	J. W. Letts Oliver.	328 Montgomery st.
Cro Imperial M Co.	Nevada.	20.	05.	Apr 30.	June 5.	C. L. McCoy.	309 Montgomery st.
Drumpton M Co.	California.	12.	15.	May 7.	June 12.	J. B. Burris.	339 Montgomery st.
Edwards M Co.	Nevada.	12.	50.	May 26.	June 12.	J. W. Willis.	309 Montgomery st.
Maydon M Co.	Nevada.	12.	20.	May 2.	June 7.	D. C. Bates.	309 Montgomery st.
Excelsior Water Co.	California.	6.	50.	Jan 29.	June 11.	J. H. B. Wheaton.	215 Sansome st.
Exchequer M Co.	Nevada.	20.	20.	May 3.	June 8.	C. E. Elliott.	309 Montgomery st.
Gold Chance M Co.	Nevada.	12.	05.	Apr 30.	June 5.	C. L. McCoy.	309 Montgomery st.
Eintracht Gravel M Co.	California.	15.	05.	May 13.	June 23.	J. H. Kuntz.	209 Sansome st.
Golden Chance Drift M Co.	California.	1.	3.	May 22.	June 23.	A. B. Paul.	328 Montgomery st.
Grand Prize M Co.	Nevada.	16.	25.	May 16.	June 20.	J. E. M. Hall.	327 Pine st.
Grete & Norcross S M Co.	Nevada.	32.	75.	May 10.	June 12.	J. F. Lightner.	309 Montgomery st.
Harold M Co.	Nevada.	12.	75.	May 10.	June 12.	J. F. Lightner.	309 Montgomery st.
Harold M Co.	Mexico.	7.	50.	May 21.	June 23.	J. H. G. Jones.	327 Pine st.
Mayflower M Co.	California.	24.	10.	May 9.	June 12.	J. J. Morizio.	328 Montgomery st.
McElroy Gravel M Co.	California.	11.	10.	May 7.	June 10.	E. W. Levy.	404 Merchant st.
McElroy M Co.	California.	25.	20.	Apr 29.	June 2.	C. L. McCoy.	309 Montgomery st.
Perless M Co.	Arizona.	1.	25.	Apr 8.	May 17.	J. H. G. Jones.	309 Montgomery st.
Potosi M Co.	Nevada.	15.	25.	Apr 23.	May 17.	C. L. McCoy.	309 Montgomery st.
Rainbow G M Co.	California.	10.	10.	Apr 15.	May 16.	J. S. Jordan.	311 Montgomery st.
Reilly Hill M Co.	Nevada.	20.	05.	June 2.	July 8.	J. W. E. Dean.	339 Montgomery st.
Reilly Hill M Co.	Nevada.	20.	05.	June 2.	July 8.	J. W. E. Dean.	339 Montgomery st.
Segregated Belcher M Co.	Nevada.	22.	1.	00.	Apr 9.	J. E. M. Hall.	414 California st.
Sheldon M Co.	Nevada.	2.	05.	Apr 15.	May 19.	J. C. V. Hubbard.	310 Pine st.

MEETINGS TO BE HELD.					
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Rodeo Con M Co.	California.	G W Sessions.	309 Montgomery st.	Annual.	June 16
Laehona M Co	Mexico	W J Taylor	220 Sacramento	Annual.	June 19
Summers Co. M Co.		F E Luty	330 Pine st.	Annual.	June 9
Amberlitt M Co.		J Morizio	328 Montgomery st.	Annual.	June 12

LATEST DIVIDENDS—WITHIN THREE MONTHS.					
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Sonanza King M Co.	California.	D C Bates	309 Montgomery st.	25.	May 15
Rodeo Con M Co.	California.	G W Sessions.	309 Montgomery st.	50.	June 5
Perche Blue Gravel M Co.	California.	T Wetzel.	522 Montgomery st.	10.	May 27
Idaho M Co.	California.			4.00	Apr 2
Jackson M Co.	California.	D C Bates	309 Montgomery st.	10.	Mar 16
Centuck M Co.	Nevada.	W Letts Oliver	328 Montgomery st.	10.	May 13
Paradise Valley M Co.	Nevada.	W Letts Oliver	328 Montgomery st.	10.	Apr 28
Staudard Con M Co.	California.	Wm Willis.	309 Montgomery st.	25.	Mar 12
Lyndicate M Co.	California.	J Stadfeldt.	419 California st.	10.	Apr 5

San Francisco Metal Market.

Table of Lowest and Highest Sales in
S. F. Stock Exchange.

		THURSDAY, June 5, 1884.
ANTIMONY—Per pound.....		14 @
BALAX—Per pound (extra).....		14 @
IRON—Gleugarran, ton.....		25 0 @
Eglington, ton.....		20 0 @
American Soft, ton.....		29 0 @
Oregon Pig, ton.....		29 @
Clipper Cap, Nos. 1 to 4.....		32 50 @ 35 00
Horseshoes, keg.....		5 50 @
Nai Rod.....		71 @
Norway, according to thickness.....		61 @ 71 @
SPRUE—Flat, 100 lb.....		15 @ 16 @
Black Diamond, ordinary sizes.....		14 @
Drill.....		15 @
Machinery.....		12 @ 14 @
COPPER—Ingot.....		22 @
Braziers.....		25 @
Fire-box sheets.....		28 @ 27 @
Bolt.....		25 @
Old.....		12 @
Bar.....		12 @
Ceansk.....		12 @
LEAD—Pig.....		41 @
Bar.....		— @ 6 @
Pipe.....		7 @
Sheet.....		7 @
Roll, diameter 40", on 800 lb. Drop.....		2 10 @
Buck, 5 bag.....		2 30 @
Chilled, do.....		2 50 @
TIN PLATES—Oharcoal.....		7 00 @ 7 25 @
Coke.....		6 00 @ 6 75 @
Turne.....		6 25 @ 6 50 @
ZINC—By the cask.....		19 @
Sheet, 73 1/2 ft, 10 lb, less the cask.....		3 25 @
NAILS—Assorted sizes.....		3 25 @
QUARTZ—By the flask.....		29 @
Flasks, new.....		1 05 @
Flasks, old.....		85 @

NAME OF COMPANY.	WEEK ENDING MAY 15.	WEEK ENDING MAY 22.	WEEK ENDING MAY 29.	WEEK ENDING JUNE 5.
Alpha.....	1.10	1.25	1.05	1.10
Altam.....	50	1.80	65	2.00
Andes.....	10	15	10	35
Argentina.....				40
Belcher.....	1.10	1.15	1.05	1.00
Best.....				70
Best & Belcher.....	1.15	1.75	1.70	2.00
Bullion.....				1.80
Bonanza King.....	35	70	40	65
Belle Isle.....	35	70	40	65
Day.....	3.45	3.75	2.95	3.35
Beaton.....	35	50	45	50
Bodie Tunnel.....	35	50	45	50
Bulwer.....	50	55	45	50
California.....	20	25	10	25
Challenge.....				15
Champion.....				20
Chollar.....	1.05	1.55	1.15	1.45
Columbia.....			1.10	1.75
Con. Imperial.....				1.35
Con. Virginia.....	20	25	20	25
Con. Pacific.....	20	25	20	25
Crown Point.....	1.25	1.45	1.20	1.40
Day.....	2.45	3.45	2.35	2.45
Eureka Con.....	1.00	1.40	1.20	1.40
Eureka Tunnel.....	1.40	2.25	2.00	2.25
Exchequer.....	10	15	05	10
Grand Prize.....			15	05
Gould & Curry.....	1.25	1.60	1.35	1.60
Goodshaw.....			10	1.05
Hale & Norcross.....	1.65	2.05	2.05	2.40
Harris.....	1.65	2.05	2.05	2.40
Independence.....			30	30
Julia.....			30	30
Justice.....	20	25	25	30
Martin White.....	20	25	25	30
Mono.....	65	85	55	80
Mexican.....	1.00	2.25	1.60	1.80
N. Diabolo.....			2.35	2.10
Northern Belle.....			2.25	2.30
North Star.....	3.75	3.75	3.65	3.75
North Bell Isle.....	2.70		30	35
Occidental.....		1.00	20	30
Ophir.....	1.25	1.70	1.20	1.50
Orion.....	1.00	1.90	1.00	1.20
Potosi.....	50	65	60	75
Pinal Con.....			70	80
Savage.....	70	50	65	75
Sierra & Belcher.....				65
Sierra Nevada.....	1.00	1.90	1.20	1.60
Silver Hill.....				80
Silver King.....			5.25	5.25
Scorpion.....	25	30	30	35
Shasta.....	35	45	35	45
Tioga.....	45	45	35	40
Union Con.....	1.70	2.15	1.85	2.15
Uta.....	3.30	1.45	1.10	1.35
Yellow Jacket.....	3.30	2.10	2.00	2.15
	45	65	65	75

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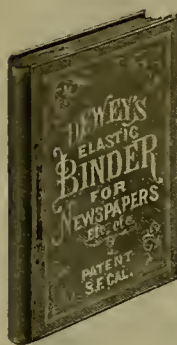
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The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented or another. This requires an exhaustive search among all the patents in the class to which the invention relates. This question can often be answered gratuitously by us, immediately on receiving full information of the invention, by reason of our long and extensive practice as patent solicitors and editors and publishers of first-class scientific and industrial journals, during the past 20 years and over. When the question of priority of invention is not so readily to be determined, it is generally best to make what is termed a "preliminary examination," by searching through the patent office reports among the patents in the class to which the invention relates, and referring to our extensive patent library, containing compilations of special classes of American and foreign inventions, mechanical dictionaries, scientific encyclopedias, files of scientific and mechanical newspapers, and an immense number of patent applications by inventors of the Pacific coast, carefully filed by this office since 1860.

If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely whereby his invention has been anticipated, thereby saving him further expense and perhaps much time, useless delay, anxiety, etc.

To avoid all unnecessary delay, however, in securing patent at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately, and forwarded to the inventor for his signature. When the inventor receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order of express receipt for our own fee. The case will then, be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps to be taken.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give a case up as long as there is a chance to obtain a patent. The Agency charge is from \$25 to \$30, or sometimes more, if the invention is intricate or complicated, or requires much labor. Drawings cost from \$5 upward, according to their number and the time employed, and, if a model is sent, the express charges upon this and the papers must be added. The total cost, in addition to Government fees, rarely exceeds \$40, and for this we do all we can without appealing the case.

When the invention consists of a new article of manufacture, or a new composition, samples of the separate ingredients to make the experiment and also of the manufactured article itself, must be furnished.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are considered more satisfactory to the Patent Office than the old and more cumbersome system of storing up an immense bulk of almost numberless models.

Drawings or sketches, sufficient to illustrate clearly the invention, with a sufficient description to enable us to make a full set of perfect drawings for the Patent Office is all that we require. A model will answer our purpose as well however, in cases where the inventor can more easily furnish it for use.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or very poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention while in reality it may be of great value, and would meet with ready sale had the invention been fully portrayed by artistic and skillfully executed drawings. Again, when patents of this character are brought into court, the uncertainty and ambiguity of the drawings enable the opposing experts to mystify the judges as to the construction or combination of parts tended to be covered by the patentee. In all cases proper by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken that the invention fully and clearly shown by different views, so that the improvement will be readily understood by the examiners in the Patent Office, and comprehended by the public when the patent is granted.

In the Patent Office

The application is assigned to the Examiner having charge of the class to which the invention relates. The case must then take its turn with others in the order of filing, and is then carefully examined to test the novelty of the invention.

If the examiner fails to find anything that anticipates the invention, a patent is immediately allowed, provided the specification and claims are drafted in proper form. Should the Examiner find a prior patent which, in his opinion, anticipates one or more of the claims in the application, a letter of rejection is sent to the attorney in charge of the case; and, if the attorney coincides with the views of the Examiner, the claims rejected are erased. In preparing applications for patents, an attorney should be careful to familiarize himself with the class of inventions to which the application pertains, so that the specification and claims may be drafted as nearly perfect in the first instance as is possible. This course saves much time in prosecuting the application to a patent.

When claims are improperly rejected in patents which do not anticipate the spirit or wording of the claims, proper steps are immediately taken to convince the Examiner of his error. This is done, in most part, by personal arguments, as the differences in construction, operation, function and results are more readily discovered and appreciated by an oral presentation of the facts than can possibly be done by relying solely on written arguments. In order that the Patent Office record of the patents shall be complete, a verbal argument is generally supplemented by a manuscript brief, that others, in examining the files at any future time may clearly comprehend the position taken by the Examiner and attorney in prosecuting the case to a patent.

In addition to our own personal attention to the interest of our clients here, we have, for over 12 years past, had constantly in association with us in Washington, one of the soundest legal counselors and ablest of practitioners in patent business in this country, who carefully attends in person to our business at the Patent Office, and has attained success in a most marked degree.

Perfect Claims.

The value and force of a patent are dependent on its claims. A patent may disclose to the public the most important and valuable invention, and yet the claim be of such meager scope that the patent is actually worthless. When the claims of a patent are so loosely drafted that infringers can flood the market with improvements, differing from the improvement disclosed by the patent only in slight changes in construction and arrangements of parts, such a patent is valueless to the owner, as it fails to afford him that exclusive and complete protection guaranteed by the Patent Law. Hence it is that the greatest care and perseverance are required, first, in properly drafting the claims in the first instance, and second, in prosecuting the application before the Patent Office, and maintaining the rights of the inventor to claims as broad and sweeping as the invention will warrant. This latter is no easy task. The examiners of the Patent Office serve in the capacity of attorneys guarding the interests of the public. It is their worn duty to exercise the greatest care and watchfulness, that patentees do not secure claims of greater scope than they are justly entitled to. It is but natural that examiners are sometimes in error as to just what scope should be accorded an invention. Although the examiners act under honest convictions in cases where they refuse an inventor his just rights, yet it is the duty of the attorney to maintain the claims of his client, if he is convinced that they are just and proper. To succeed in this requires the display of tact, firmness and ability; and when the Examiner is made to see that the inventor is honestly and fairly entitled to the claims which have been rejected, he will almost invariably recede from his former action, and allow the case.

Advantages to Inventors on the Pacific Coast.

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Inventors on this coast will find that owing to our familiarity with inventions and local affairs of this coast, we can more readily and fully comprehend their wants, and thus save much of the time ordinarily consumed in preliminary writing back and forth when distant agencies are employed.

Caveats.

A caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the caveat to receive notice, for a period of one year, of any application for a patent subsequently filed, and which is judged to be novel, and is likely to interfere with the invention described in the caveat, and the caveat is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$10 additional.

To enable us to prepare caveat papers, we only require a sketch and description of the invention.

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Inventors who have rejected cases (prepared either by themselves, or for them by other agents), who desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

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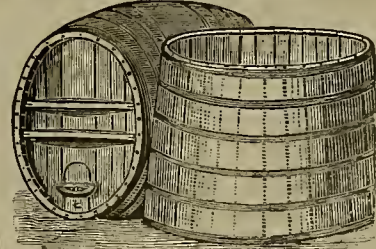
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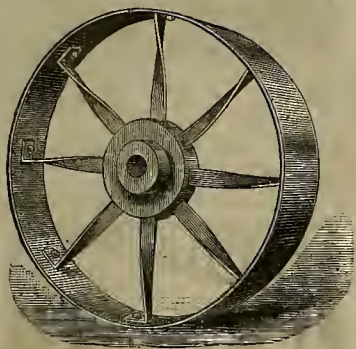
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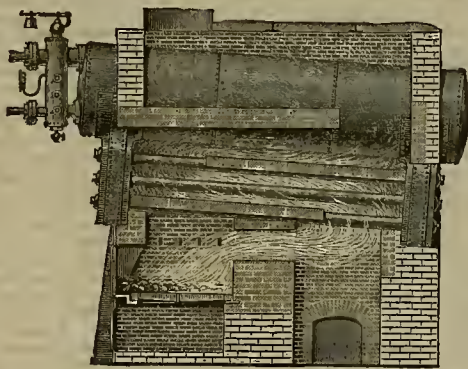
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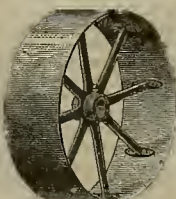
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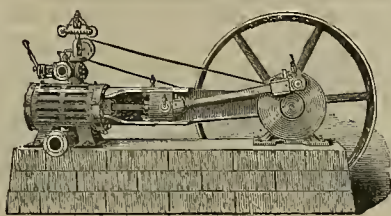
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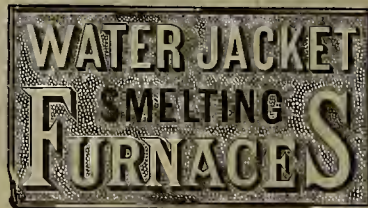
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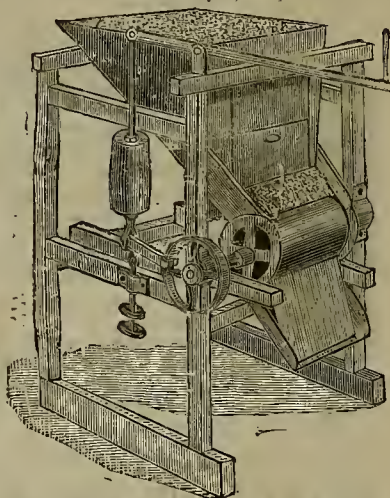
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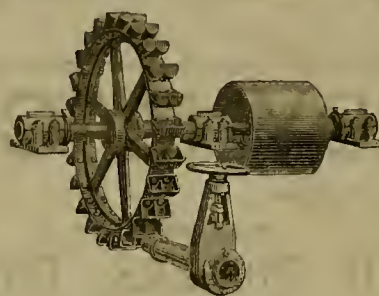
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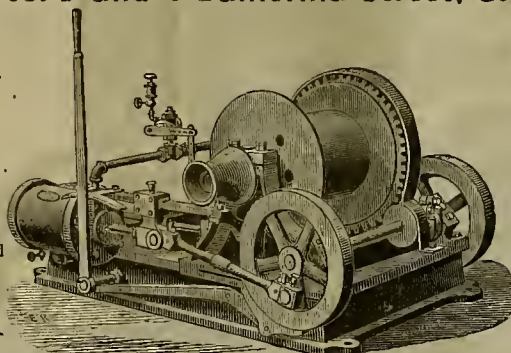
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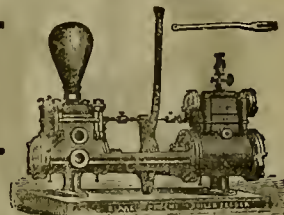


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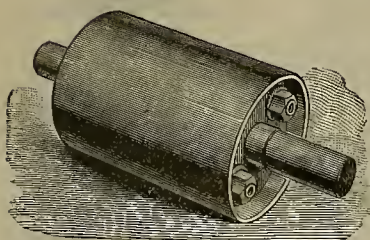
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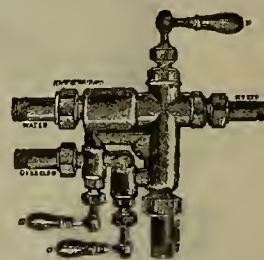
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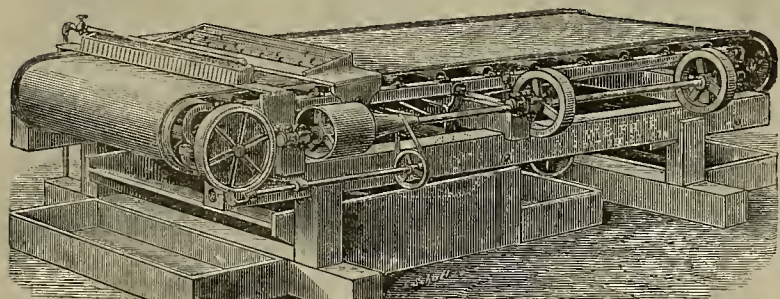
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That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringers.

That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

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427 Bourne on the Steam Engine, 1874, 88; Appleton's Dictionary of Mechanics, Mor., 87; Iveson's Horse Power Diagram, 82; Tunnel Building, Atlas and Text (German), 82.50; with a large assortment of other Books and Scientific Magazines, at HEALY'S, 104 O'Farrell St.

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SAN FRANCISCO, SATURDAY, JUNE 14, 1884.

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Mining and Mechanical Engineers.

It is a matter of remark that while the mechanical appliances of mining, the hoisting and pumping machinery, mills, furnaces, etc., have been very greatly improved in the last ten or twenty years, the improvements in mining methods are by comparison few. In the mechanical branches of mining the mining engineer has had at his disposal the improvements in machine construction effected by the united labors of mechanical engineers throughout the world, and he has not been slow to adapt to his requirements the improvements in steam engineering and all the miscellaneous mechanical inventions. The number of engineers and inventors engaged in mechanical work is very large; the number of mining engineers comparatively small, and the incentives to invention among the latter are not so great. Again as there is always a large amount of machinery to be designed, erected and kept in repair, at extensive workings, a mechanical engineer is frequently chosen to superintend the mining work and without knowing or caring much about mining, he is placed in the position which should be occupied by an expert mining engineer.

The truth is, the mechanical engineering ought to be done by mechanical engineers and the mining operations by mining engineers. One great trouble with us has been that there have been altogether too many with a partial knowledge of both professions, and a thorough one of neither. Moreover, a great deal of the credit really due to mechanical engineers has been taken by men who happened to be mere superintendents, and who, from merely giving an idea of a general plan, were supposed to have worked out the details which really ensured success. Of course it cannot be expected that the mechanical engineers will devise many new mining methods, while the mining engineers do devise new mechanical plans. It has become too much the custom to have the mining engineer attend to what are really the duties of a business superintendent, such as paying bills, looking out for pay-rolls, correspondence, etc., which occupy so much time that he cannot attend to his legitimate duties. And many persons suppose that the man who can do these things well is really a mining engineer, which is far from being the case. A mining superintendent is not by any means always a mining engineer. There are hundreds of people who assume the title without any right to it.

The American Society of Civil Engineers convened at Buffalo on Tuesday. About 4,000 delegates were present. Papers were read by distinguished members on engineering questions. Resolutions were passed asking President Arthur to appoint President Whittimore a delegate to the International Standard Time conference. The Nominating Committee consists of G. S. Fields of Buffalo, A. Fink of New York, George Gray of San Francisco, F. E. Kieffer of Ottawa, and Henry Flagg of St. Louis.

The Manhattan Silver Mining Company, of Austin, employs 115 surface men and 121 miners on day's pay, 35 contractors, 404 tributors and 48 leasers. The mills reduced in the last week a trifle over 118 tons, of the assay value of \$37,427.85.

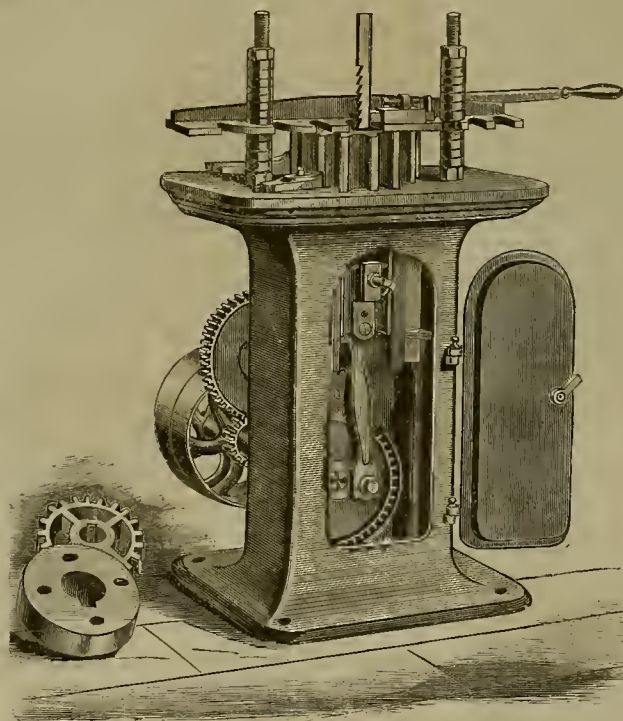
Encourage the Prospectors.

It is the duty of every one, at all interested in the mining industry of the country to encourage the prospectors in every possible way. They are the men who find the mines; they do the preliminary work so essential in making a good mine, to wit: First find your mine. Capitalists never find a mine; it is the prospector who does it. The capitalist develops it. We hear a good deal about encouraging capital but not so much about encouraging prospecting; whereas, if there is not first found a claim there is nothing for the capitalist to do. This great pioneer in mining fields—the prospector—does really more hard work for less pay

work. It is one of the prime characteristics of the class that prevents them—not laziness. They are prospectors, not mine developers. They have no money for this. Very few dollars are needed to carry on their business. Their grub costs little, lodging nothing, and transportation nothing.

But to open and prove the real value of a mine takes money. The prospector is willing to take a comparatively small sum for his prospect for the very reason he knows it is little use to him. Of course we speak of quartz. There are few sections for placer ground in these days.

The prospector, then, has a definite duty to perform in the body politic. He is as necessary



THE DAVIS' KEY SEATER AND SLOTTING MACHINE.

than any other class of working men. Yet strange to say, many look upon him as more or less of a nomadic vagabond with no settled occupation, and who is mainly waiting for something to turn up.

The real prospector of the mountains is by no means an idler, or a vagabond. In the winter months he must hibernate; once the snow is off, he has plenty to do to occupy him. So far from being but a mere wandering miner, or a hanger-on of mining camps, his is a real business. Many good miners are very poor prospectors, and there are lots of prospectors, who cannot be persuaded to stick to work with pick and gad underground. They will shoulder their blankets, and few tools, however, and tramp over the mountains for months, camping here and there and looking carefully all the time for prospects.

Once the claim is found, however, the charm is gone. The man wants to sell this and hunt for other claims. Then is the chance for the man of capital. Before that he is of no use. His time comes when the claim is found. And because these prospectors do not develop their claims or work them at all steadily, some people profess to think they are lazy and will not

in his chosen field as the capitalist in his. Our mining regions are discovered by him—our rich mines really found by him. It must be only, therefore, the thoughtless or the ignorant who see in the prospector a vagabond or a tramp. He is neither. Honest as the day is long, simple in habits, persevering and hopeful, the prospector is one of our pioneers of civilization to whom the country owes a debt of gratitude.

MINING FOR WATER.—The Quijotoa Prospector of May 31st says: There are 10,000 pounds of machinery at Casa Grande, consisting of boilers, pumps, piping, etc., for use at the Bonanza Mining Company's well. We understand that a large double-compartment shaft will be sunk, and drifts run from the bottom. A series of pumps will be placed in the shaft, and the water question thus thoroughly tested as to the quantity available.

A TECHNICAL commission on the Suez canal, to discuss the question whether a second canal parallel with the present one shall be built or the present canal enlarged, will soon be appointed. The commission will consist of eight English, eight French, and six other engineers.

Technical Society of the Pacific Coast.

At the regular semi-monthly meeting of the new society on Friday of last week, Mr. W. W. Hanscom, mechanical engineer, read a paper on "Cable Railway Propulsion." Tables were given showing the comparative weight of machinery and weight of cables on all our local roads, the horse power to drive cable; pounds of cable moved per horse power; proportion of power required to drive cable; average power for cars; horse power for each car; average speed; average distance passengers are carried; average power, for each 1,000 passengers carried; total power for cable, for cars, and for passengers, etc.; some very interesting facts were elicited. On an average of all our roads it takes 68 per cent of the power to drive the cable alone; 23 per cent to move the cars and only 4 per cent to carry the passengers. Aug. J. Bowie, Jr., mining engineer, read a paper on "The Measurement and Flow of Water in Ditches." He described the California miner's inch as it varies in different localities, and gave the determination of the inch experiments at Columbia Hill in this State and those at La Grange. He then gave the formula to determine the flow of water in open channels, co-efficients for roughness, etc. Mr. Bowie gave several examples of the value of co-efficient in ditches, and brought out numerous valuable facts which have been suggested in our experience in mining ditches, etc., in this State, giving examples of the loss of water in various ditches while flowing from one end to the other. The subject is one of which Mr. Bowie has made a study for some years, and his conclusions are valuable to the engineering fraternity. We shall publish these papers when the drawings are prepared.

Key Seating and Slotting Machine.

Among new tools of interest to iron workers is the Davis patent key seater and slotting machine, a representation of which is given on this page. It will be noticed in the general design that the frame is made of one casting together with the ways, and therefore very strong and cannot get out of line. The connecting rod is so arranged as to keep chips and dirt from falling into the crank-pin. The gears are all cased, and therefore are in no danger from anything getting into them. This casing is not shown in the cut. The ways are bored out and the top of frame faced by putting the frame in a mandrel and facing up the top of the column in the lathe; the top is planed on both sides, and by this arrangement every part is brought perfect and true.

The saw clamp is handy, and requires but a short time to change cutters. The stud pins to clamp are provided with washers, and so arranged that the clamp can be placed between them at any height required, and will not drop down. A very simple arrangement is also furnished to give any desired draft to the key seat required. It can also be made any depth, and every one can be the same. This is a very desirable point, and is now made to work so perfectly that this machine can be used in all shops where key seating is required. The pulleys are 13 inches in diameter and 4½ inches face. This machine will cut from one-fourth inch to one inch key seats, and work very fast. The Perry & Place Machine Company are agents for this coast.

Electric Currents in Mines.

At a recent meeting of the Manchester Geological Society, Mr. John Knowles read a paper "On the Descent of Electric Currents into Coal Mines." During a thunderstorm which took place on the 21st of February last, a distinct shock was felt in the workings at the New Rivin Pit, Little Lever, near Bolton. The colliery was situated close to Hall-lane, the main road between Moses Gate and Radcliffe, and about three miles from Bolton. The upcast pit being about 30 yards from the road and the downcast, 50 yards. The upcast pit was 9 feet in diameter inside the brickwork, which rose as a chimney about 24 feet above the ground. In this pit there was no winding, but there was one pulley 5 feet in diameter, which stood without rope, to be used with a portable capstan engine in case of emergency. There were also two folding iron doors, which took up a space in the chimney 8 feet high by 5 feet wide. The pit was 97 yards deep. The downcast pit was also 9 feet in diameter and 97 yards deep, with a sump of 14 yards further. In the pit were four iron wire guides, 1½ inches in diameter, and two iron wire ropes between the cages; the former went into the water at the sump, and the latter terminated just below the landing plates. There were also a bell wire of galvanised iron, and 3 in. steam pipes, which were mostly uncovered. The two cages were made of iron, a steel rope being used for one cage and an iron rope for the other. This pit was surrounded with the ordinary cast plates and rails, but there was not any connection with the chimney of the upcast shaft. There were the usual buildings about the pits, viz., engine-house, hoilers and cabins; also a chimney 6 ft. square and 20 yards high, but no lightning conductor on it. At the bottom of the downcast pit there were the usual plates and rails, with the steam pipes extending to two engines on the east side and one on the west. Those going eastward were laid up a brow, with a gradient of one in three, to the Lower Three Yards mine, and then a short distance on a level to the first engine, which wound up the down-brow in this mine. At this point there was a rise tunnel to the Lower Yard mine, worked as a self-acting incline. The steam pipes were carried to the top of this tunnel, and then on a short level to the engine at the top of a down-brow in the Yard coal, where a wire rope was used to wind the coal to that point. There was also a wire rope used in that brow to work a small pump, which forced water to the top of the incline, whence it ran to the pit.

On the west side the steam pipes were laid on a level in the Lower Yard mine to a small engine, which wound coal up a dip tunnel from the Lower Three Yards mine. This engine had a 6 in. cylinder, with 10 in. stroke, the dip tunnel being 48 yards long with a gradient of 1 in 5. The electric current appeared to have struck the chimney at the top of the upcast pit, about 2:30 p. m. on the day named. It displaced a large quantity of brickwork, and then came down outside the chimney, striking the ground close to it and making a large hole. It then went along the ground to the cast plates at the top of the downcast pit, and it was presumed went down the steam pipes and so into the workings—on the east side going through the Yard down-brow engine, and along the rope to the wagons, and on the west side passing along the pipes to the engine, where the manager was standing. The strength of the current must have been very great, as experienced by a wagoner seated 4 or 5 yards from the bottom of the downcast, as he stated that he saw a brilliant flash, and heard a great noise, which sounded as if in the pit. He had the heel of his clog on one of the plates at the time, and felt a tingling sensation in his leg, which lasted a day or two, and the sole of his clog was burnt, as if hot irons had been drawn over it. Other men in the pit also experienced a sensation which they described as resembling a shock received at an electrifying machine. The manager, who was on the west side in the Lower Yard mine, at a small engine 300 yards from the pit, had his hand on the steam handle and felt a shock which numbed him for a few seconds, so that he could not see or move, and was afterwards so completely prostrated by the effects of the shock that he was confined at home to bed for six days before he was able to get up and walk.

From the statements which had been made by the men it would appear that there must have been a very strong current of electricity passing down the ironwork of the pit, and it was fortunate that much of it was distributed before it reached the workmen in contact with any metal. The manager being the nearest in direct contact seemed to have suffered the most, as the wagoner was only connected with the plates by a wooden clog, and others at the bottom of the Lower Yard coal incline only received a shock after it had passed many means of distribution. Two other cases of a similar kind had occurred—one at the Tanfield Moor Colliery on the 12th July, 1880, on which a paper was read before the members of the North of England Institute of Mining and Mechanical Engineers, and the other at West Thornley Colliery, on the 11th December, 1883, with regard to which a paper was also read before the same society.

The miners at Cœur d'Alene are jumping the claims which are idle and which were located by proxy.

Phosphorus in Iron.

Frank Julian, Iron Mountain, Michigan, read before a recent meeting of the American Institute of Mining Engineers the following note "On the Determination of Phosphorus in Iron:

After the solution of an iron ore, or metallic iron, in an acid, for the determination of phosphorus, it is necessary to evaporate the solution to dryness and to heat the residue to effect the complete separation of silica. Authorities differ as to the temperature required, some recommending not over 100° C., others as high as dull redness. For the purpose of securing some indications as to the degree of heat which may be safely or advantageously employed I selected a gray pig-iron, a piece of Bessemer steel rail, and a sample of Ludington ore having the following composition, the phosphorus in the pig and steel being determined by Gintl's ferric chloride method:

Twenty-five grams of the ore, having the composition A, was dissolved in hydrochloric acid, and filtered into a 500 cc. flask. There was added 3.1 grams of silicate of sodium and 1.155 grams crystallized phosphate of sodium, and the liquid made up to the mark.

Twenty-five c. c. of this solution, having the composition B, 1 gram of the pig, and 2 grams of steel, were taken for each determination. The metals were dissolved in 10 c. c. and 20 c. c. of nitric acid, specific gravity 1.25. After heating the dry residue, it was dissolved in the least possible quantity of hydrochloric acid, which was replaced by evaporation with 25 c. c. of concentrated nitric acid, and precipitated with a 7 per cent. nitric acid solution of molybdic acid. After solution of the phospho-molybdic silica was separate, and any adhering phosphorus recovered. The magnesium precipitate was always reprecipitated to free it from molybdic acid (traces of which invariably adhered to the first precipitate) weighed as pyrophosphate, and corrected for solubility. Great care was taken to have all the conditions of each determination as nearly identical as possible. The following are the results obtained:

No.	Temperature.	Pig.	Ore.	Steel.
1.	No evaporation.	.....	.....	.....
2.	95° C. 1 hour.	.341	.407	.....
3.	110° 12 hours.	.375	.400	.137, .139, .132
4.	125° 1 hour.	.377	.401	.157
5.	170° ½ hour.	.444	.401	.....
6.	125° 2 hours.	.453	.....	.....
7.	170° 1 hour.	.456	.....	.158
8.	220° 1 hour.	.456	.398	.....
9.	350° 1 hour.	.453	.398	.....
10.	450° 1 hour.	.456	.398	.....

In No. 1 the steel was dissolved in acid, and the molybdic solution added at once. No. 2 was the heat of a water-bath; No. 3 steam pipes; Nos. 4, 5, 6 and 7, an air-bath; Nos. 8, 9 and 10 fused-metal baths. The first four, in each case, dissolved readily and completely; Nos. 5 to 8, completely, but with difficulty; while Nos. 9 and 10 required much acid and a prolonged digestion, and a considerable quantity of ferric oxide remained undissolved.

While somewhat different results will undoubtedly be obtained from other samples, I think the following conclusions may be safely drawn:

	Pig.	Steel.	Ore.	A. B.
Comb. carbon.	.64	.569	Silica.....	3.39 sol. 1.00
Graphite.....	2.40	.....	Phosphoric acid.....	1.007
Silicon.....	2.85	.077	Sulphuric acid.....	trace.
Sulphur.....	.06	.....	Alumina.....	.79
Manganese.....	.51	.022	Lime.....	.85
Phosphorus.....	.450	.165	Magnesia.....	.51
Iron, etc.....	92.081	97.970	Manganese ox.....	.62
			Ferric oxide.....	95.37

1st. That a temperature of at least 125° C., for two or three hours, must be used where the amount of silicon or silicic acid is at all large.

2d. That any temperature short of dull redness may be employed without interfering with the accuracy of the determination; the heating with an acid reverting any meta- or pyro- into ortho-phosphoric acid; but that a temperature of from 125° to 170° is to be preferred, as saving time and acids in re-solution.

3d. That the silicon in metallic iron is much more prejudicial to the complete separation of phospho-molybdic than the silica from a soluble silicate.

THE TWIN PROSPECTS.—The ore vein in the Found Treasure continues to improve. The incline is down 23 feet, and the vein has widened gradually, but uniformly, with every foot of depth attained. There is now nearly a foot of rich chloride ore, which will probably mill from \$300 to \$500 per ton. The ledge itself is about 4 feet in width, and the main vein is on the foot-wall, although there is a narrow streak of the same quality of ore close to the hanging-wall. More hands will be put on this evening, and the work will henceforth be prosecuted night and day. The owners of the Mayflower have commenced an incline close to the Found Treasure line, and at a depth of 8 feet have a vein 10 inches in thickness of the same character of ore as that being extracted from the adjoining location. The incline is about 175 feet from that of the Found Treasure, and is undoubtedly on the same ledge. The discovery in the Mayflower renders it pretty certain that the ore vein is continuous through the intervening ground between the two inclines. These, so far as developed, are the most favorable surface prospects that have ever been encountered in this section, and if they continue on down, as present appearances indicate the probability of, they will in the near future produce a sufficient amount of ore to keep all of the stamps in the district in continual agitation.—*Tuscarora Times-Review*.

The Black Hills.

What is termed the Black Hills country is all that part of Dakota lying south of the 45th parallel of north latitude and west of the 102d meridian, and all that part of Wyoming lying north of the 43d parallel and east of the 105th meridian, and embracing about 22,500 square miles, or 14,500,000 acres, of which about one-fourth is agricultural, the other three-fourths being mineral and pastoral lands. About 400,000 acres, all of which are in Dakota, have been taken under the homestead, pre-emption and timber culture acts. The balance is now open to settlement, with the exception of a small portion lying east of the banks of the Cheyenne river and the 103d meridian. The farming lands of the hills are as productive as can be found any place in the world. Fifty bushels of wheat, 60 of barley, 110 of oats, 400 of potatoes and 600 of onions have been raised per acre of ground. All other kinds of vegetables do equally as well; potatoes that will weigh two or three pounds are common, and some have been raised that went as high as four pounds. The soil is a rich vegetable mold, strongly impregnated with gypsum, of which there is an inexhaustible supply, and consequently the land need never become impoverished.

Gold mining is carried on from Bear gulch on the north to Custer City in the southern part of the Hills, a distance of 90 miles, and from Rockford on the west to Rockerville on the east. In no other country in the world are there so many and extensive mines of gold as in the Black Hills. From the northern to the southern, and from the eastern to the western extremity, gold is found in nearly every gulch and on every hill within the mineral belt. In other mining countries it is only found over a small area of country, covering but a few miles of territory at the most. Here there are about 1,200 square miles in what is called the mineral belt, and gold is found in almost every square mile of the 1,200. The lodes vary in size from 10 to 1,000 feet in width, and some as much as 50 miles in length. The great majority of the mines are low-grade ore, but with the immense bodies of pay ore and good management these mines have been made to pay better than any other in the United States. Ore that will go \$2 a ton will pay to work, while that which goes from \$4 to \$10 per ton will pay largely. The ore which is worked by the great Homestake mills, at Lake City, does not average \$7 per ton, yet that company have paid 51 successive monthly dividends, part of which have been \$30,000 per month, and the balance \$40,000, besides having a large surplus on hand after paying all expenses. These mines are better developed than any others in the Black Hills, but equally as good and extensive mines have been discovered.

The quartz mills are the largest and most complete in the world; nearly all have from 40 to 120 stamps.

The silver mines of the Hills are all of a high grade. Those of Galena have been worked continuously ever since 1876, and the ore shipped by wagon to Sidney, 250 miles, thence by rail to Omaha, Nebraska, for treatment. At the carbonate camp, seven miles west of Deadwood, rich carbonate mines have been opened, the ore from which is now being shipped to Omaha and Denver.

Rich and extensive copper mines have been discovered in several localities.

The mica mines of the Black Hills are all in the vicinity of Harney's peak and Custer City. They are easily worked, requiring very little capital. All that is necessary to work a mica mine and get the mica ready for market are a pick, shovel, drill, powder and fuse and a large pair of shears, such as are used by tinners, to cut it in rectangular form.

On Box Elder, near Brownville and Rockford, are several large veins of iron, with millions of tons in sight. At the latter place it carries from \$2 to \$10 per ton in gold.

On the north, south and west of the hills are hundreds of thousands of acres not used, owing to the cost of transportation.

Inexhaustible beds of gypsum encircle the entire Hills, just inside the foothills and outside the main Black Hills. At present it is only used by plasterers. With the advent of railroads, it will be shipped to the States east of the Missouri river, there to be used as a fertilizer on their worn-out land.

Petroleum is found on the west side of the Hills in Wyoming Territory, near the boundary line between Dakota and Wyoming. No works have as yet been established for refining. It is only used for lubricating purposes by the Home-take and other companies at their mills. Salt springs are situated about eight miles northeast of the oil springs and in Wyoming Territory. Salt for the entire hills is manufactured here, and sold on the ground for two cents per pound.

Marble of a beautiful purple color is found near Rapid City and Custer, and sandstone, granite, slate, porphyry and limestone is plentiful, and is found in every part of the Hills.

The Black Hills is a well watered country, being drained by the forks of the Cheyenne river and their tributaries. On hot Spring creek in Custer county are situated mineral springs which are fast acquiring a reputation for curative powers second to none in the United States. The average temperature is 95 degrees Fahrenheit.—*Custer Chronicle*.

Underground Haulage.

The subject of underground haulage, to which comparatively little attention has been paid on this coast, is one of increasing importance among the extensive mines of Great Britain, particularly in the Lancashire coal field, where the great depth of the mines has led to large areas being worked from each shaft. The economical transportation of the coal from the working places to the shaft has become a matter of great necessity. At the collieries of the Astley and Tyldesley Coal and Salt Co., in the older and shallower pits the various systems of haulage comprise self-acting planes, single down-brow ropes, main and tail and endless ropes, the engines in each case being placed underground and supplied with steam through pipes in the upcast shafts. In some cases horses are entirely dispensed with, and in others were used for hauling the coal from the workings along the levels to the main down-brow ropes. Mr. G. H. Pearce, at a recent meeting of the Manchester Geological Society, read a paper on the system of underground haulage at these collieries, giving extended details. A general statement of the plan will be of interest to miners here. At the Gin pit the hauling engines consisted of a pair of horizontal high-pressure engines, with cylinders 10 inches diameter and 2 feet stroke, geared 3½ to 1, and working at about 140 revolutions per minute, with a boiler pressure of 70 lbs. On the second motion shaft were placed two driving pulleys, each 6 feet diameter, with a clutch to enable either of them to be put out of gear. Each pulley had 4 grooves, and to obtain the requisite adhesion, the rope was passed 3½ times over the driving pulley, and a guide pulley with three grooves was put in front of it. By this mode of driving the friction on the ropes was reduced to a minimum.

The ropes were then passed round pulleys 6 feet diameter, fixed in the headgear and down the shaft in wood pipes. Upon reaching the respective mines, pulleys were fixed in the shaft, and the rope was taken along the centre of the main way round a pulley 4 feet diameter, fixed on a tram with a tightening screw at the extreme end of the plane, and it returned along the side of the road on pulleys and wood rollers. In each mine the system adopted was to run the tubs in sets of from thirty to forty, the rope being carried on the top of the tubs, and attached at each end of the tram by ½-inch chains about 7 feet 6 inches long, which were wrapped two or three times round the rope and back hooked. The distance to the station ranged from 700 to 1,300 yards, and the time ordinarily occupied in the journey from the shaft, changing at the end and returning, was from ten to fifteen minutes. The coal was all brought to the main rope either by gravitation or by haul from the working places. One of the principal items of expense in all underground haulage was the cost of ropes, and they attached great importance to the quality of the material and mode of construction. The standard size adopted for the hauling ropes was ½-inch diameter, and they were made with six strands of the best plough steel. The average quantity of coal hauled per day was 260 tons, but at least 400 tons could be hauled per day, and he estimated the cost of labour at 12s. 4d. per day, and of materials at about 1.321d. per ton. At the Nook pit they utilized a pair of engines for hauling, which were also used as capstan engines, with cylinders 12 inches diameter and 2 feet stroke, geared four to one, working at a boiler pressure of 45 lbs. At these pits, instead of each rope being brought to the surface, only the main driving rope worked in the shaft, and from it were worked the branch ropes into each mine, by means of grooved pulleys. In this pit they had been at some disadvantage in having to adopt the existing roads for rope haulage, as they were not originally laid out for that purpose. In one mine the rope was carried round curves at both ends of the shaft by deep flanged pulleys 4 feet 6 inches diameter, and at lesser bends by small pulleys, also with deep flanges. The road was also undulating, which necessitated the use of lashing chains at both ends of the train, which consisted of about five tubs each at short intervals. For an average quantity of 440 tons he estimated the cost of haulage at about 35s. per day for wages, and about 1.749d. per ton in materials for leading the coals an average distance of 1,400 yards.

THE body of Wm. H. Blythe was enshrouded when he died some 14 months ago, and placed in a hermetically sealed casket which was put in a sealed niche in the receiving vault. Owing to a desire on the part of relations in England, it was decided to photograph the remains. The casket was taken from the niche last week and unsealed. The body was found to be entirely free from any taint of decay. It was perfectly odorless, and the features were as full and the flesh apparently as sound as when it was placed in the casket. There was no shrinkage whatever. The face and eyes and the hair were all perfectly natural.

THE Pacific Improvement Company's steamer makes two to three round trips every month, bringing 4,000 tons of coal to this port on every trip.

THE production of the Calumet & Hecla, of Michigan, in 1882, was about 32,000,000 pounds, and in 1883 its yield was about 33,000,000.

MECHANICAL PROGRESS.

Improved Method of Producing Steel Plates.

Dr. Henry Muirhead, president of the Physiological Society of Glasgow, has recently brought before that body some particulars of a method of manufacturing steel plates for ship-building and boiler-making purposes, which is of much interest. It is the invention of Mr. Joseph Whitley, of Leeds, who has erected works for prosecuting the manufacture. Briefly describing the process, Dr. Muirhead said: "A hollow metal cylinder lined with gannister or other brick revolves at high speed, the axis being horizontal. A gutter or rhone perforated with holes passes into the interior along its whole length. Into this gutter is poured melted mild steel, which, escaping through the holes, is carried round by the swiftly revolving case, and centrifugally is formed into an inner cylinder of steel of an inch or more in thickness. This cylinder, while still hot, is drawn out, cut across by a saw, put into a rolling mill, and rolled to the length and thickness required." Mr. Whitley writes: "Suppose I wish a plate for ship-building; then, say, even a mold 5 feet in diameter and 5 feet long; in it I cast a cylinder an inch thick. This, when taken out and cut, is fully 15 feet long and five feet broad. It is then rolled down to half an inch in thickness. Such a plate is then 30 feet long and 5 feet broad, for we can arrange that the displacement of the thickness shall be chiefly endwise. The present mold is 9 feet long and 5 feet in diameter. With it I successfully cast a mild-steel shell—weight of metal about 30 cwt. This makes the long-looked-for, but now no longer doubtful, fact a historic fact in metallurgical science. Hitherto, these plates have been made from large ingots, which have been burnt on the outside while getting heated to the center. It is the overheated portion that gives way in collisions, boiler burstings, &c. In my process the whole plate is homogeneous throughout, and the tensile strength is so much increased that when ships collide there is no bending or fracture; and though the bilge is made to collapse, the ship, still floating can sail into port to get rebilged—recountoured. Of course, tubes of smaller size can be manufactured centrifugally, and these are especially suitable for connections about steam boilers, where in lap-welded tubes breakage is apt to take place at the overlap."

Perforated Feed Pipes.

Perforated feed pipes, having their delivery ends capped, are very pretty things in theory, but in practice, if the water used be anything but the very best, they are a source of continual trouble and annoyance. The small holes are very easily clogged with scale, and feed pumps are very frequently broken in the effort to force sufficient water into the boiler. The perforations may be stopped in two different ways: Firstly, by the formation of scale around them, which "comes down," as it is usually expressed, the hole gradually becoming smaller and smaller, until it becomes entirely closed up; secondly, by the lodgment in the end of the pipe of small pieces of scale, which, having been formed in the heater or some remote part of the pipe, has become detached, or "flaked off," and brought forward by the current of incoming water, and lodges in the end of the pipe in consequence of its being capped over, and gradually fills it up. In a case which occurred recently the feed pump was twice broken in the effort to keep sufficient water in the boiler before the cause of the trouble was suspected by the engineer in charge. A steam gauge placed between the boiler and feed pump indicated something over 100 pounds as the pressure required in the feed pipe to keep the boiler supplied with water when the steam pressure was but 60 pounds. Upon examination by the inspector, the perforations were found nearly closed by a formation of hard scale around them. The only remedy in such cases is to remove the perforated portion of the pipe, and discharge the feed water through the open end. If the pipes are properly arranged, no harm to the plates or seams will result, even if cold water is used; and unless the water be quite bad, it will be sufficiently well flushed by the incoming water to keep it quite clean for a long time.—*Locomotive.*

Progress in Locomotive Construction.

The locomotive of to-day is a giant by the side of the production of 1851. The New York Central express engine is a very Anak. Its weight is 84,000 pounds, or nearly two and a half times heavier than its above mentioned prototype. The cylinders are eighteen inches by twenty-four. The average man's head is far below the top of the driving wheels, which are seventy-five inches in diameter. In 1854 a New York express passenger locomotive traveled 25,000 miles in a year; last year the average mileage per engine stood between 70,000 and 80,000 miles. A locomotive for express passenger service costs, taking the experience of the past few years, from \$7,500 to \$10,000 to build.

In comparing the locomotives of to-day and a quarter of a century ago, you will notice that while the weight of the whole machine has increased greatly, certain of the dimensions have

not altered much. This is because we are limited in various ways in constructing a locomotive. We can not make the body of the engine over a certain width, because of the gauge of the track, not over a certain height, for we must keep the center of gravity at about the same position; not over a certain length because of the wheel centers. So the locomotive must always remain nearly the same in form. It is to increased capacity of boilers that we must look for increase of power. At present an express locomotive boiler is of eighty-horse power; that is, if it were in a stationary engine that would be its capacity. But when the locomotive is drawing a train of cars at five miles an hour, the boiler supplies the strength of 375 horses, and at forty-five miles an hour, the power expended is equal to that of from 700 to 800 horses.

STEEL NAILS.—The near approach of the manufacture of steel nails by the Bellaire (Ohio) Nail Works Company is attracting a great deal of attention, not only among the nail manufacturers of the West, but also among the workmen at the mills. As yet the works have been operated only experimentally; some nails have been cut, and it is expected that shortly they will be operated continuously as a steel nail works. It is also stated that the Riverside steel plant will be in operation about the 1st of June. This experiment on the part of Bellaire and Riverside will be watched with a good deal of interest. It is probable that no higher price can be obtained for these steel nails than rules for iron nails. It has been claimed that because the steel nails can be cut smaller—more to a pound than the iron nails, and be as strong as iron nails, therefore consumers will be willing to pay an additional price; but the value of a nail in many instances does not depend upon its strength, but upon the frictional resistance to the strain that would draw it out of the wood, and it is probable that the iron nail of the same size would have a greater frictional resistance than the steel, and certainly the larger iron nail would have a greater friction than the smaller steel nail. That steel nails can be manufactured, and probably as cheaply as the iron nail, cannot be doubted. The problem is, how will they take in the market.—*Industrial World.*

NEW STONE SAW. A new sort of saw for cutting stone is described in *La Semaine des Constructeurs*, which seems to have advantages over those now commonly in use, and is easily and cheaply made and operated. In place of the ordinary long steel blades, supplied with sand to enable to grind their way into the stone, the new machine presents only a slender endless cord, composed of three steel wires twisted together, which is stretched over pulleys in such a way as to bring the lower portion horizontally over the stone to be cut. The frame carrying the pulleys is movable, so that the cord can be brought into contact with the stone, or lifted away from it, at pleasure, and the whole is kept in rapid motion, while water falling in drops from a reservoir above serves to moisten the stone. The three wires which form the saw differ from the ordinary kind in being square in section, and by twisting into a cord they are so turned as to present a succession of oblique cutting edges, which act, when set in motion, in nearly the same way as so many small chisels, while the rapidity with which the blows follow each other probably adds to the effect.

POINTING STEEL.—To draw a piece of tool steel to a point may appear a simple operation at first sight, but unless care is taken it cannot be done. If the end of the bar of steel is concave in the slightest degree, it cannot be pointed. For in hammering it the surface steel is made to overrun the center, and causes the extreme end to be concave in a greater degree than when it was started, and so long as this concavity exists, the steel cannot take a fine point. Before commencing to draw the steel to a point, the extreme end of the piece of steel should be ground or filed to a rounded point, similar to a center punch, but not so sharp. When this is done, a point as fine as a needle may be drawn out. Care must be taken not to over-heat the steel, or it will crumble to pieces. It should not be heated above cherry-red heat.—*Science Monthly.*

WIRE NAILS.—The manufacture of wire nails is an industry that is now receiving quite an impetus in this country. It has not, as yet, reached large proportions, but bids fair to grow rapidly. There are about a half a dozen manufacturers of wire nails now in business, and two or three companies have lately been organized to come in for a share of the trade. By means of automatic machinery, wire nails may be made quite cheaply. In France they are used more than cut nails.

REDUCED PRICE OF CHAINS.—A proprietor of a chain works says that in 1865, when he first commenced making chains, he got over \$1 a pair for trace chains, seven years later 65 cents, and now 35 cents. For coil chains, in 1872, he got 28 cents a pound, against a little over 61 cents now.

The actual cost of making a ton of iron in the Lehigh Valley, Pa., is put down by Mr. McCreat, chemist of the Geological Survey of Pennsylvania, at \$30.35, itemized as follows: Ore, \$9.34; coal, \$5.30; limestone, \$0.77; labor, \$2.33; incidentals and repairs, \$2.64.

SCIENTIFIC PROGRESS.

The Evolution of Mind.

In a lecture on the dawn of mind, delivered at Owens College, Manchester, England, March 28th, by Mr. G. J. Romanes, he claimed that the whole structure of mind took its rise from excitability, or the aptitude to respond to nervous stimulus, which was a characteristic of all matter that was alive. Next to excitability, in an ascending scale, they had the functions of discrimination and conductivity. Discrimination he believed to be a function of all nerve-cells; it was the power to discriminate one stimulus from another, irrespective of the degrees of their mechanical intensity. Conductivity was a function which admitted the possibility of reflex action, and of the co-ordination both of muscles and of ideas. In the faculty of discrimination they had the physical aspect of that which elsewhere was called choice, because choice, if it was analyzed, was merely the power of discriminating between one stimulus and another. With the aid of an elaborate diagram, Mr. Romanes traced what he held to be the various grades in the process of mental evolution from excitability as the root of the mind. The diagram had forty lines or levels. Any given level represented the earliest stage in the development of all the faculties named therein—the animals in which, and the age of the human being at which, they first appeared; also the grade of development at which human intelligence was arrested in idiocy and deaf-mutism. The diagram was not, he said, a mere production of his imagination, but was the result of his study of the subject. At the bottom, on a level with excitability, he placed protoplasm. Reason, he thought, arose out of the powers of perception, for the simplest possible perception involved some act of inference—an act unconsciously performed, perhaps, but performed all the same. Regarding reason in its lowest phase, it must be placed immediately above the association of ideas, because they might regard it as a process of unconscious or deliberate inference, and this occurred in monkeys, dogs and elephants. Next above reason he placed indefinite morality, or the germ of conscience. Indefinite morality was the feeling of dislike at offending those for whom the child or animal having felt an affection. Definite morality was much higher in the scale; it was, in fact, at the top, on a level with man. A child at birth he placed, in this process of mental evolution, on a level with jelly-fish; at five months old, he put the child on a level with pigs, horses and cats; and at nine months, on a level with the anthropoid apes. He could not help feeling that the doctrine of evolution, as a whole, was a somewhat hard doctrine—hard as an answer to the question which must at some time, or in some shape, have occurred to most: "Shall not the Judge of the whole earth do right?" The answer that evolutionists made to that seemed to him to be a hard one, for it said that in the order of nature the race was always to the swift, and the battle, without fail, to the strong. Thus the voice of science proclaimed a new beatitude: "Blessed are the fit, for they shall inherit the earth." This doctrine seemed to constitute might the only right. But if this world was a world of sorrow, struggle, pain and death, at all events, the result, so far, had not been altogether profitless. Whatever the "far off divine event" might be, to which "the whole creation moves," the whole creation, with all its pain, and in all its travail, was certainly moving, and moving in a direction which made, if not for righteousness, certainly for improvement.

Phosphorescence of the Diamond.

Experiments are reported as having been recently made in Paris on the phosphorescent properties of the diamond. This precious stone, says a foreign exchange, has been supposed to be one of a small number of bodies which possessed the property of emitting light after having been exposed to the sun or electric light or submitted to the action of friction. But this interesting fact has, until recently, been hardly more than an apothesis, on account of the difficulty of procuring gems of sufficient size to experiment upon, for the diamonds in laboratories and geological museums were all too small to give satisfactory results. All of the large and well-known diamonds are of too great value to be in the possession of private experimenters: such stones as the Kohinoor, the Regent, the Grand Mogul, the Sancy, &c., are all held by different governments. Recently, however, through the courtesy of M. J. Picard, the head of one of the largest diamond importing houses in Paris, certain French scientists obtained the use of a very large diamond. The stone weighed not less than 92 carats, and is said to be the handsomest one in the possession of any private individual. This diamond, which is valued at \$100,000, is of perfectly pure water and of admirable cutting. The results of the experiments made were as follows: 1. That when exposed for the space of an hour to the rays of the sun and then transferred to a dark chamber, and a sheet of white paper held near it, it omitted light for more than 20 minutes, visibly illuminating the paper. 2. That the same phenomena occurred, but with illuminating power of slightly less intensity, when the diamond was similarly exposed to the electric light, as produced by an arc lamp. 3. That after being rubbed for a

few seconds with a coarse flannel cloth the diamond became decidedly phosphorescent.

IGNITING POINT OF EXPLOSIVE.—The question of the temperature at which various explosive mixtures of gas and air become ignited has recently been carefully investigated by two French chemists, Messrs. Mallard and Le Chatelier, their experiments having been carried out with hydrogen as well as carbon gas mixed with air in different proportions. The temperature was recorded by a pyrometer heated in a Morot melting furnace; the interior of the pyrometer was connected with a gas reservoir and with the air in such a manner that the mixture to be tested could be admitted as soon as the desired temperature had been reached. In order to prevent mistakes, repeated experiments were made at degrees of heat which were purposely fixed a little under or over the point of ignition, as already ascertained. From the results of these tests it was found that a mixture of 70 parts of air and 30 parts of hydrogen gas ignited at a temperature of from 1026 to 1028 F., while the temperature of ignition for a mixture of air and carbon gas in similar proportions varied from 1202 to 1215. Increasing the proportion of carbon gas, it was found that the point of ignition could be further raised to 1337.

PHOSPHORESCENCE FROM ATTRITION.—At a recent meeting of the New York Academy of Sciences, Mr. G. F. Kunz stated that while unpacking some specimens of fluorite from Amelia county, Va., he had noticed the display of phosphorescence, a pale greenish light, by the mutual attrition of the specimens, the same being excited also by the warmth of the hands. By the heat of a candle, this phosphorescence was increased, and, on a red-hot stove, became a deep emerald-green. This led Mr. Kunz to examine fluorite from over a dozen localities, and he found that only chlorophane yielded phosphorescent light by attrition. In Phillips's *Mineralogy*, edition of 1823, a specimen of fluorite, described by Pallas, from Siberia, is mentioned, which yielded light by the warmth of the hand. The fact that attrition will cause phosphorescence, Mr. Kunz considered new, and as the same result was produced by chlorophane from Branchville, Conn., it was looked upon as a new distinguishing characteristic between chlorophane and common fluorite, as petiolite from Bergen Hill is distinguished from the fibrous zeolites and other associated minerals.

MICROSCOPIC EXAMINATION OF WATER.—The detection of micro-organisms in potable waters is of considerable hygienic importance. When they are present, yet in relatively small numbers, their detection is difficult unless they can be concentrated in a small volume, which cannot, of course, be accomplished by evaporation. This may be effected by precipitating them in a precipitate that dissolves readily in acids. Brautlecht makes use of a solution of one part of aluminum sulphate in eight parts of water and one part of hydrochloric acid. He puts five drops of this solution in the water to be tested, then adds three drops of the official aqua ammonia, which precipitates the alumina, and with it any organic matter. This he collects upon a smooth filter, and while still soft scrapes it off with a glass rod and dissolves it in ten drops of acetic acid. In these ten drops are to be found all the micro-organisms previously distributed through a large quantity of water, and this is used for microscopical examination. If necessary they may be stained with a suitable dye.—*Pharm. Zeitung.*

THE COLORADO SCIENTIFIC SOCIETY.—Messrs W. P. Hillebrand and Richard Pearce, of the Colorado Scientific Society, recently made a preliminary communication to the Academy of Natural Sciences of Philadelphia in regard to an interesting group of minerals recently found in Utah, some of them being new to the United States. The minerals found are, enargite and the secondary hydrous arseniates, olivenite and conicalite (Dana's System of min., p. 555), with two amorphous substances corresponding, apparently, to pitticite and chenevixite. The olivenite occurs in small, distinct crystals; the conicalite, in form similar to that from the only locality previously known, in Spain, while its chemical composition is also very near to that of the original mineral, a small amount of copper being replaced by zinc. Jarosite, turgite, and one or two as yet undetermined species, occur sparingly with the above. Mr. Pearce also exhibited pseudo-malachite associated with hubnerite from near Phillipsburg, in Montana.

THE MICROSCOPE IN MEDICAL PRACTICE.—Mr. Andrew Carnegie, of New York, has recognized the growing importance of the microscope in medical practice in the following practical manner: He has made an absolute gift of \$50,000 to Bellevue Hospital Medical College of that city. This sum is to be expended in the erection of a building and an apparatus to be devoted to laboratories for practical work and teaching in medicine. It is the design of Mr. Carnegie to establish a laboratory for the conduct of microscopical investigations, for which this country now affords no facilities adequate with the importance of the work.

PRIZE OFFER.—The Italian government has determined to offer, on the occasion of the opening of the Turin exhibition, a prize of four hundred pounds for the most practicable process for the transmission of electricity.

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SAN FRANCISCO:

Saturday Morning, June 14, 1884.

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Passing Events.

The copious rains of the past few days are a matter of wonderment to Californians who never expect any such downpour at this season. They have done considerable damage, which is much to be deplored.

In the sinking of the winze to the 3200 ft. level of the Mexican mine, on the Comstock this week, the greatest underground depth on this continent has been reached. The miners work at great disadvantage at these depths, but still persevere on their explorations.

They have been striking some rich quartz in the Cœur d'Alene mining region, Idaho, and it is hoped that a good quartz country will be developed in addition to the placer mines.

The trial of a new system of street car propulsion in our city, elsewhere referred to, is a matter of importance to the community, since air is to displace horse-power on two of our local roads. Interesting problems will be solved, moreover, from an opportunity to compare the cable, horse and compressed air systems of car propulsion, side by side.

EDWARD BADLAM, the sixteen-year-old son of Alexander Badlam, has received a United States patent for an improved steam boiler which he invented. The youth has also several other applications for patents on file at the Patent Office.

Bullion Production.

The different bullion producing States and Territories west of the Rocky mountains have none of them any official whose duty it is to collect the statistics of bullion production. This is mainly left to the newspapers, and we have reports more or less correct. The Government, however, does collect the statistics, but not in a perfectly satisfactory manner. The Department of Mineral Statistics of the U. S. Geological Survey attends to all the statistics of production except those of gold and silver. The Director of the U. S. Mint collects those and publishes them in his annual report. Our main dependence has always been placed on the figures collected by Mr. Valentine, General Superintendent of Wells, Fargo & Co.'s Banking and Express Co., and his statistics have usually been regarded as more accurate than those collected by the Government employees. Most of the data on the subject is based on the figures yearly presented by Mr. Valentine.

It is noteworthy that the Valentine statistics always show a larger yield than those compiled by the Mint Director. The express company enumerates all that passes through their hands in transportation, adding a percentage for the amount carried by private hands. The Mint takes its deposits, crediting them to the region from which they came. The annual report of the Mint Director has just been issued, and a summary of the bullion product has been telegraphed here in advance of the receipt of the book. The figures are for the calendar year 1883, and the total yield of gold is set at \$24,000,000, and silver (at its coining rate) \$46,105,000. We have tabulated the statement, placing the States and Territories in the table in their rank as bullion producers:

State or Territory.	Gold.	Silver.	Totals.
Colorado.....	\$410,000	\$17,300,000	\$17,710,000
California.....	14,120,000	1,460,000	15,580,000
Nevada.....	2,500,000	5,430,000	7,930,000
Montana.....	1,800,000	6,000,000	7,800,000
Arizona.....	950,000	5,200,000	4,150,000
Utah.....	140,000	5,630,000	5,770,000
Idaho.....	1,400,000	2,100,000	3,500,000
Dakota.....	3,200,000	150,000	3,350,000
New Mexico.....	280,000	2,845,000	3,125,000
Totals.....	\$24,000,000	\$46,105,000	\$70,105,000

The remainder of the total was produced in Alaska, Oregon, Georgia, and North Carolina; and the aggregate shows a falling off from the previous year of \$2,500,000 in gold and \$600,000 in silver.

It will be seen that according to these figures Colorado still holds first place in the list of bullion producers and first place as a silver producer. California still holds first place as a gold producer and second position in rank as bullion producer. This is the same result as last years figures showed. Nevada still holds third place as bullion producer, and second place in silver production. The table is very suggestive, giving as it does the results of work done in the different mining regions. It does not follow, it will be seen, that where there is the most talk there is the most work. While our mining industry has been depressed in California we have kept the same relative position we have had for many years, as compared with other regions.

Coal in California.

Now that so many manufacturing establishments are running in our midst, the question of our coal supply is a very important one indeed. Our own coal supply in the state is from the Mt. Diablo mines, but it is not liked for domestic purposes, being mainly used for making steam. The Coos Bay coal field in Oregon gives us a large quantity as does the mining region of Washington Territory, and British Columbia. Vancouver's Island shipments last year were 300,000 tons and Washington Territory shipped 164,986 tons. The Mt. Diablo mines yielded in 1883, 76,162 tons. From Tacoma, W. T., we received last year 137,420 tons. We get coal also from Australia, Great Britain, and the Atlantic Coast. When we have a heavy crop of grain, we get a great deal of foreign coal, the ships coming here for grain, bringing the coal. With a short crop our foreign coal imports always fall off. The statements, given below, will serve to indicate the consumption of the several varieties of coal at San Francisco. The principal sources of supply, are from Mt. Diablo, in the immediate vicinity; from Coos Bay and Renton in Oregon, and the ports in Washington Territory; from Vancouver's Island, from Australia and Great

Britain, as also Cumberland and Anthracite from the Atlantic Coast.

Qualities.	Tons, 1883.
Foreign—Australia.....	150,316
English, Welsh and Scotch.....	155,192
Vancouver.....	117,822
Eastern—Anthracite.....	26,725
Cumberland.....	16,555
Domestic—Mount Diablo.....	76,162
Coos Bay and Renton.....	24,525
Seattle, W. T.....	164,986
Tacoma, W. T.....	137,420
Total.....	860,615

Frederick E. Seward, of New York, issues each year a little work on “The Coal Trade,” giving statistics from all over the world. We received the book last week, and compile from it some statistic of local interest. The following table shows total receipts of coal at San Francisco for the past three years:

Qualities.	Tons, 1881.	Tons, 1882.	Tons, 1883.
Foreign—Australia.....	126,296	158,901	150,316
English, Welsh and Scotch.....	231,313	188,771	155,192
Vancouver.....	158,022	157,762	117,822
Eastern—Anthracite.....	13,697	24,996	26,725
Cumberland.....	24,982	14,860	16,555
Domestic—Mount Diablo.....	103,055	113,255	77,162
Coos Bay and Renton.....	20,000	14,533	24,525
Seattle, W. T.....	152,893	154,611	164,986
Tacoma, W. T.....	.....	54,627	137,420

The production of coal in the United States for the year 1883 is as follows:

States.	Tons.	States.	Tons.
Alabama.....	1,400,000	Montana.....	50,000
Arkansas.....	75,000	New Mexico.....	250,000
California.....	200,000	Ohio.....	8,220,429
Colorado.....	1,000,000	Oregon.....	60,000
Dakota.....	50,000	Penn., anthracite.....	31,793,027
Georgia.....	200,000	Penn., bituminous.....	24,000,000
Idaho.....	10,000	Tennessee.....	1,000,000
Illinois.....	10,508,791	Texas.....	100,000
Indiana.....	2,400,000	Utah.....	250,000
Indian Territory.....	175,000	Virginia.....	225,000
Iowa.....	3,881,300	Washington Ter.....	200,000
Kansas.....	850,000	West Virginia.....	2,250,000
Kentucky.....	1,650,000	Wyoming Ter.....	700,000
Maryland.....	2,306,172		
Michigan.....	135,000	Total.....	96,159,719
Missouri.....	2,250,000		

Below will be found the analyses of some coals found in British Columbia:

PLACE.	Thickness of Seam in feet.	Water.	Carbon.	Fixed Carbon.	Ash.	Sulphur.
Queen Charlotte Island:						
Anthracite coal.....	3 to 4	1.60	5.02	85.75	6.69	0.80
Vancouver's Island:						
Newcastle coal.....	3 to 4	.....	35.49	52.57	11.04	.....
Wellington (Dunsuir seam).....	4 to 6	.....	34.70	55.50	9.80	.....
Exmouth River (Comox).....	4 to 5	.....	32.51	57.73	14.44	.....
Trent.....	3 to 4	.....	52.28	56.76	7.32	.....
Union Mine.....	5 to 10	1.70	27.17	68.27	2.86	.....
Baynes Sound Mine.....	5 to 6	.....	49.56	54.70	5.75	.....
Mainland, Brit. Columbia:						
Nicola River.....	15 to 3	.....	21.51	74.58	3.91	.....
Hut Creek.....	42 to 46	8.60	35.51	46.84	9.05	.....
Chilliwack.....	5	.....	35.73	63.86	.41	.....
United States:						
Seattle coal, Puget Sound.....	11 to 60	35.49	45.97	6.44	.....	.....

We find the following analyses of Coos Bay and Astoria coals compared with Nanaimo and Bellingham Bay:

	Astoria Coals.	Coos Bay.	Nanaimo.	Bellingham Bay.
Water.....	2.56	20.60	2.98	8.39
Volatile matter.....	46.29	32.30	32.16	33.26
Fixed carbon.....	48.41	41.08	46.41	45.69
Ash.....	2.74	5.34	18.55	12.66

The coal production of the world in 1882, from the best sources, was as follows:

	Square Miles of Coal Area.	Tons.
Great Britain.....	11,900	156,490,977
United States.....	192,000	86,849,846
Germany.....	1,770	65,333,925
France.....	2,086	20,803,332
Belgium.....	510	17,590,853
Austria.....	1,800	19,000,000
Russia.....	30,000	3,600,000
Spain.....	3,501	900,000
Novia Scotia.....	300	1,365,811
Australia.....	24,840	2,100,232
India.....	2,000	1,000,000
Japan.....	5,000	800,000
Vancouver's Island.....	390	335,000
New Zealand.....	.....	50,000
Chile.....	.....	50,000
Sweden.....	.....	90,000
Italy.....	.....	220,000
Total.....	.....	379,718,162

With regard to wages paid for digging coal in the United States, it may be stated that the highest price is paid at Lerdo, Texas, an 18-inch coal being \$1.50 per ton. The lowest figure is at Latrobe, Pa., 26 cents per ton.

Customs officers have been instructed to be careful to confine the issue of certificates to Chinese laborers who depart directly for foreign ports, and to refrain from issuing them to laborers who intend to proceed to China or any other foreign port via some other port in the United States, or to Chinamen who are not laborers.

S. W. TALMAGE, of Michigan, has issued his annual estimate of the spring and winter wheat crops. They are as follows: Spring wheat—Minnesota, Nebraska, Iowa, Dakota and Wisconsin—total, 141,000,000 bushels; winter wheat, in all other States and Territories, 375,000,000 bushels, or a grand total of 516,000,000 bushels.

MILLER's objection prevented Glascock from getting through the House his bill for a public building at Sacramento.

The Cœur d'Alene Mines.

We had a conversation this week with a gentleman connected with one of the large foundries in this city who has just returned from a visit to the Cœur d'Alene mines, in Idaho, and obtained from him some points of general interest. To get to the mines from here he took the steamer to Portland, Oregon, and then went on the Oregon railroad to Wallula junction, where he took the Northern Pacific for Rathdrum. From that station he went by stage 12 miles to Post Cœur d'Alene and across Lake Cœur d'Alene, 60 miles, on the steamer. On this fine new steamer there are good accommodations, and the passenger may remain aboard all night if he desires. The scenery around the lake our informant pronounces finer than that at Lake Tahoe. He took the stage again for 18 miles to Jackass Prairie, and then 20 miles across the mountains on a Cayuse pony to Eagle.

It is stated that there are about 5,000 people in the mines, but it is difficult to decide on this, so many are scattered through the mountains prospecting. There are a good many from the east and Colorado, huying up claims—Leadville men being particularly active in this. There are comparatively few men from California.

The gravel in the mines, our informant says ranges from 3 to 30 feet in depth, but mainly deep, and the gold is nearly all on the bedrock. The gold is coarse and heavy, and is worth from \$17 to \$18 per ounce. One man buys most all the gold and ships it to the government assay office at Helena, Montana. The bullion shipments attract therefore little attention, individuals shipping little.

In prospecting, the men find places where the bedrock is not deep, but in many cases they go down through the deep gravel. The “Widow's” and “Dream Gulch” claims are the principal ones, though there are many others of less importance being worked. The Dream Gulch, running a short time, cleaned up an average of 90 ounces a day. The gulch is easily worked. They use a 60-inch head through an ordinary 6-inch canvas hose with brass nozzle, like hydraulicking, and have about 150 feet of sluices. The gold being heavy, is easily caught in a short string of sluices. The gravel they are washing is about 20 feet deep, but nearly all the gold is on the bedrock. They have even gone over the bedrock two or three times, and when our informant left they were scraping the soft bedrock the third time.

An offer of \$85,000 has been made for the claim. They have 2,640 feet in the mine. They had worked one twenty-sixth in length without touching the sides, and had taken out \$14,000 after working a short time. In one place, measuring 8x12, on the bedrock, they took out 62½ ounces of gold.

Very few of the claims are fitted up for good work. The two mentioned and one other are the only ones at all ready for work. The Earp Brothers, formerly of Arizona, have a claim well rigged up with flume, overshot wheel and Chinese pump, like an old-fashioned California placer mine. A short flume serves to bring in the water, and they have fall enough to their ground to have no trouble.

There is considerable water all through the claims, and the little valley is soaked, but later on there will not be so much trouble from this source, but at both Eagle and Murray the miners will have to dig long bedrock drains or rig pumps, in order to work their claims properly. Those in the gulches, like the “Dream,” have fall enough to get rid of the water easily, but at other places they will be compelled to pump more or less to keep the claims clear.

A great drawback is the lack of roads, of which there are none between the camps and and none nearer than 20 miles. All provisions have to be packed in, and the lumber has to be whip-sawed. There are three sawmills near Eagle, yet all the lumber used at Murray is whip-sawed. The dwellings are of log or canvas. The country is thickly wooded and hard to travel in.

There are several good quartz prospects, but as yet there is no machinery. One big prospect is the Mother Lode. A slab of quartz shows above the water on Pritchard Creek, which the owners say shows \$10,000 in gold, but others say the slab carries more likely, \$1,500 or \$2,000. They have not taken it out, desiring rather to sell. The quartz shows across the creek, and

they want \$100,000 for the claim. The first excitement brought town lots up to exorbitant prices, but there is plenty of land and nothing to warrant it. Many persons have left Eagle and gone to Murray, which will be, if it is not now, the main center of the region, most of the best mines being in the vicinity. The great difficulty now is that the miners now there, have no money. They came in early and exhausted their resources. They need money to open their claims. They own the claims, but that is all. It is the opinion of our informant, that though the region is rich beyond question, it will not be developed as it warrants until outsiders come in, buy, and work the claims, with the exception of the few well-known rich ones. Experienced men there pronounce the country a rich one and with great future possibilities both in placer and quartz mines. There are some very rich quartz prospects at Evolution and on Beaver Creek.

There is now talk of building a road between Eagle and Murray. If they do, it will help the whole country. They will get in their supplies and necessary lumber cheaply, by wagons, in that case. Provisions are now high, and it is of course impossible to "pack" in lumber. There is also a move to build a road in from Trout Creek, which will give then a road 32 miles from the railroad track.

Atlanta and Rocky Bar.

In concluding the series of articles on Idaho mining districts, with the maps from the report of the Director of the United States Mint, we present a sketch showing the surroundings of Atlanta and Rocky Bar.

Rocky Bar is situated in the western part of Alturas county, on Bear Creek, a tributary of the South Boise river. The mines here are all gold mines, the ore being either free milling or rich sulphurets. The chief mines which have been worked during the past year are the Idaho and Vishnu and the Ada Ellmore. The Idaho and Vishnu rank with the best gold mines of the Territory, but until lately have not been systematically worked. The owners had leased them to miners of limited means, who extracted the ore without keeping development work ahead, and left the mine in bad condition.

During the past year the property finally changed hands, and under an able and experienced management work has been vigorously and systematically pushed forward. The Ada Ellmore has long been a large producer of gold, and since it was first opened has produced over \$1,000,000. It is a true fissure vein, of free-gold bearing ore, 4 feet wide, which will probably average \$60 to the ton.

There are a number of other mines in this district which, under careful, intelligent, and economical management, could be made to yield large returns and give a future of importance and influence to a section of country which has not hitherto attracted the attention its importance demands. Fifteen miles north of Rocky Bar is Atlanta, on the Middle Boise river. The formation in this district is granite, with dikes of syenite and varieties of porphyry. The veins carry both gold and silver, and run nearly east and west. The principal ledge is the Atlanta, on Atlanta Hill, which has been traced for a distance of nearly 2 miles, and from 30 to 80 feet in width. In this there are several veins carrying ruby silver, silver glance, black sulphuret, native silver, and free gold. The chief mines on this lode are the Buffalo, Monarch, Last Chance and Leonora. The Buffalo has continued its operations steadily. Since 1874 it has produced an average of \$100,000. The Monarch is an old mine, having been located 20 years ago. The property consists of 1,600 feet, running east from the center of Quartz Gulch. The ore was formerly worked with a wet-crushing, 10-stamp mill, but the result was unsatisfactory, and the company owning the mine leased it until 1878. Since that time it has been operated by the company, the lessees having found the mine so profitable that the company refused to renew the lease. The Last Chance mine is the property of the Atlanta Hill Gold Mining Company. The ore is free milling, and runs from a 3 foot vein.

THE President has sent to the Senate a message suggesting the propriety of Congress appropriating \$588,000 for the purpose of making a complete and harmonious exhibition on behalf of the Government at New Orleans. It was referred to the Committee on Appropriations.

Pneumatic Street Railway.

There has just been completed at the Risdon Iron Works, in this city, an experimental car to be run with compressed air by a new system, a trial of which was made last week. The subject is one of great interest, more especially as the system will be tried where close comparisons can be made between it and both cable and horse-car as to relative economy. In the new plan there is a storage and charging pipe which carries the air below the surface of the road-bed all along the route, contiguous to the track. Through a system of valves attached to this pipe, closely set together within the track, the pipe may be tapped and the receivers replenished at any and all points on the route. In this way the system is so arranged that the car is never removed from its source of supply, and has no determined distance to

be run as an open car, after the style of the cable road dummies, and the air receivers are placed under the seats. From these receivers, which are connected by a pipe, a hose connection is made which terminates in a metal nozzle, in the end of which is fitted a valve to make connection with the service pipe, as described hereafter.

The main service pipe is placed underground, near the track, and is large enough to have in itself storage capacity sufficient to insure that the drawing off of each charge for the motors will not greatly decrease the pressure. It is thought that a pipe of five or six inches diameter will do for roads running cars five minutes apart, whilst it should never be less than four inches in diameter.

This main pipe is provided with right angle branches, say every 300 feet more or less, which lead to the center of the track and terminate in

reducing valves. It is expected that the new cars can run on the Howard and Mission street routes where they are expected to be placed, at a pressure of 30 pounds, but this can be increased at will by means of suitable mechanism. When the conductor strikes the bell for a passenger to get on or off, the engineer stops at just where the next valve of the supply pipe is located or within a few feet thereof. These valves are placed at street crossings generally. The engineer then takes down his feeding nozzle and inserts it into the hole in the street and connects. The air rushes through the nozzle and fills the reservoir until the bell sounds to start, when the nozzle is taken up and replaced on its stand. The engineer need not wait to get the first few pounds of pressure but may start with such pressure as he has obtained. In this way no unnecessary delay occurs.

The car or motor need not be required to travel over six or eight blocks, or even a less distance, where stops are frequent. The valves may be placed at crossings or even every hundred feet if necessary. It is desirable to be able to refill the receiver at every stop to have great pressure when starting. Several suggestions have been made to operate street railroads with compressed air carried near the track, but none have included within their scope the system here proposed, which is the invention of Mr. George Parry of this city. In this system the maximum weight of the load and contingencies of the trip do not control, but have only the effect of limiting the distance the motor will be capable of traveling without having recourse to the supply pipe, constantly at hand. In fact those stoppages which are of necessity, caused by taking or of leaving passengers are the only ones necessary to make, it being calculated that these will be ample in most cases to give the required opportunity to replenish the receiver.

In running on this system they get over the great loss of power required to move a cable. On the cable roads 68 per cent of the power is necessary to drive the cable alone without counting cars or passengers. Then again it is different from steam dummies or locomotives in this, there is only one central fire for the compressing machinery, instead of separate fires, boilers, etc., for each machine. They expect to utilize 50 per cent of the useful effect of the compressed air. One engine supplies all the cars. These cars are expected to go up a grade of one in fifteen.

The experimental trial of the system made last week proved very satisfactory to the promoters. The car ran with 100 pounds pressure for three-quarters of a mile one trip, and seven-eighths of a mile the second trip. The car weighed about 3½ tons and the passengers 2½ tons. The highest speed attained was 16 miles per hour, and the car went up a grade of one in thirty-seven at 8 miles per hour. The connecting valve worked satisfactorily. It is probable that this system will be adopted by the Howard and Mission street car lines. They propose to erect one engine house on the corner of Howard and Tenth streets, which will serve to compress air for both roads, each paying its proportion of expenses. The details have not, however, been arranged by the companies.

The Rains.

June rains have been phenomenally heavy this year. It is usual to have a nice sprinkle, but a drenching rain which sends water pouring down the hillsides and makes mud of all the summer dust is something altogether exceptional. It will furnish another peg on which to hang the popular theory that the climate is changing and that we may lose our dry summers after all. The trouble with such claims is that we have in fact a very small cycle of experience to figure on in California, and we are apt to be surprised at things which perhaps have happened time and time again just before the year with which our records begin.

These heavy June rains are not acceptable as a rule, though it is likely that their evil effects are sometimes exaggerated. This year they have spoiled quite a large amount of hay, but they have also prolonged the pasturage season by giving new vigor to the grasses and sprouting new seeds.

WILLIAM E. SHARON, a nephew of ex-Senator Sharon, has been appointed Superintendent of the Yellow Jacket mine, to fill the vacancy caused by the resignation of Charles Forman,



ATLANTA AND ROCKY BAR, IDAHO.

travel with each charge, so that it may have a minimum capacity as to storage room and pressure of air instead of the maximum, as when the length of the journey to the charge is absolute and fixed.

Compressed air motors have been run a definite distance without replenishing, as from end to end of a route and back, and suggestions have been made to run from station to station, using a pipe connection between, but in all cases provision has had to be made for carrying the heaviest possible load of passengers under the most adverse circumstances likely to occur, such as those arising from very frequent stoppages, bad condition of the track, accidental delays, etc. The definite points could not be passed without re-filling the receivers, and either the engineer had to go or the motor itself had to be taken to the station off from the main line in the act of re-filling, this system of operation leading to all the difficulties which have heretofore surrounded the use of compressed air as a motive power for street roads. No practical system has been put in use so far by which the motor could be re-supplied with air at any and all points on the route.

The motor which has just been tried is con-

structed as an open car, after the style of the cable road dummies, and the air receivers are placed under the seats. From these receivers, which are connected by a pipe, a hose connection is made which terminates in a metal nozzle, in the end of which is fitted a valve to make connection with the service pipe, as described hereafter. The main service pipe is placed underground, near the track, and is large enough to have in itself storage capacity sufficient to insure that the drawing off of each charge for the motors will not greatly decrease the pressure. It is thought that a pipe of five or six inches diameter will do for roads running cars five minutes apart, whilst it should never be less than four inches in diameter. This main pipe is provided with right angle branches, say every 300 feet more or less, which lead to the center of the track and terminate in

reducing valves. It is expected that the new cars can run on the Howard and Mission street routes where they are expected to be placed, at a pressure of 30 pounds, but this can be increased at will by means of suitable mechanism. When the conductor strikes the bell for a passenger to get on or off, the engineer stops at just where the next valve of the supply pipe is located or within a few feet thereof. These valves are placed at street crossings generally. The engineer then takes down his feeding nozzle and inserts it into the hole in the street and connects. The air rushes through the nozzle and fills the reservoir until the bell sounds to start, when the nozzle is taken up and replaced on its stand. The engineer need not wait to get the first few pounds of pressure but may start with such pressure as he has obtained. In this way no unnecessary delay occurs.

Wilmington Harbor.

One of the most important works ever done by the government on this coast was the improvement of Wilmington harbor, near Point San Pedro. This was one of the first shipping points ever utilized on this coast, and many will remember the description by Dana in his famous "Two Years Before the Mast," where he tells how they loaded hides in the old brig near Deadman's Island. In those days when southeasters came the vessels had to try and ride them out, or else stand off to sea. Now, however, the government has formed a safe and capacious harbor which is the shipping port of Los Angeles, the chief city of Southern California, which is situated twenty-one miles inland.

The harbor was formerly called San Pedro bay. Before the U. S. engineers took hold of the harbor the bar was very shoal and even the small steamer carrying passengers from the ocean steamers at the moorings in the roadstead

wells, and been, in fact the presiding genius of the place. He has been for very many years in the freighting and transportation business at San Pedro.

Wilmington harbor was made a port of entry in June, 1882. It has steadily increased in importance as a shipping point since the Government began improving it. Between \$600,000 and \$700,000 have been appropriated by Congress for the work, but it has proved a fortunate thing. The city of Los Angeles is the metropolis and railroad center of Southern California, is 500 miles distant from San Francisco, and is the largest city south of that point. Its unrivaled resources, the unlimited market for its diversified products, and superb facilities by rail and sea for the transportation thereof, attest to its superior advantages for becoming a great commercial and maritime metropolis. The increasing competition for the trade of the southwest, caused by new lines of railroads, aroused the Southern Pacific managers to the necessity of establishing a first-class harbor in Southern California for the transaction of their business, and, after a thorough examination, Wilmington was selected for that purpose. The railroad has been extended from thence to deep water, a dis-

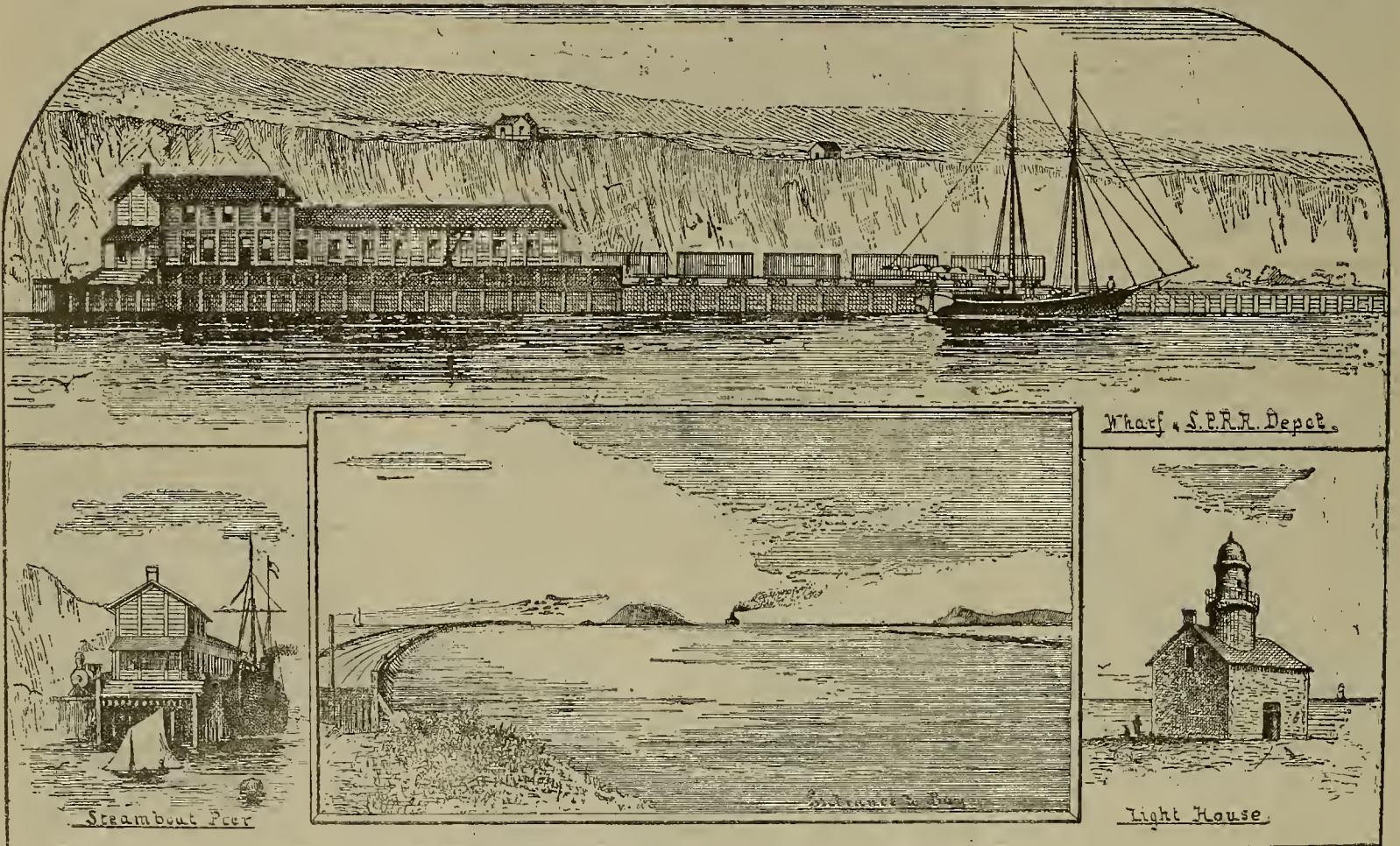
Prevention of Accidents in Mines.

The following essay, by William Davison, a deputy in the Hedley Hill Colliery, obtained the second prize in the Peases' West Institute competition, and was published in the *Colliery Guardian*:

Explosions.

(1.) To keep all winning places and exploring drifts well in advance of the general workings of the mine, and if of a gaseous nature, to have boreholes in front and occasionally in the roof and floor in the neighborhood of faults, etc., as a precaution against any sudden outbursts. The places being well ahead, time would thus be secured to deal with the danger before being come up to by the rest of the workings. Eruptions of gas, to a large extent, may thus be met successfully, provided such places are worked by the exclusive use of the safety lamp, and the air from such places never on any account allowed to pass into the rest of the working places, its probability to ignition being reduced according to the number of lamps it has to pass. (2.) Such mines to be formed into districts, en-

thus be able to bear an enormous strain, or if preferable, they could be built of iron, but however they are built they should be able to resist an explosion from either side, and should not be depended on unless able to do so. Air will go the most direct route it can get from the shaft, and that ought according to theory (even in the occurrence of a blast) to be through the portion of a mine it is intended to supply with air, consequently the ventilation should depend on nothing liable to be disorganized by a blast. (5) The application of fans for the purpose of ventilation, as being decidedly safer than furnace ventilation. Two fans would be better than one, each to work a stated period alternately, the fan not going to have its connection with the pit broken off, so that if the working fan was in any way injured by explosion or accident, the connection between the mine and the other fan could at once be established; or if a furnace was used it should not be supplied with the return current, which should be conducted by dump drifts beyond the reach of fire, and no fear of the return coming in conjunction with it. (6.) A thorough knowledge of air ventilation and gases should be acquired by all underground officials, so as to immediate-



VIEWS OF WILMINGTON HARBOR, LOS ANGELES COUNTY, CAL.

up to Wilmington could not cross it at less than half tide. The entire business of the place was done by lightering; coasting vessels and steamers can now enter the harbor. The lumber vessels and other freighters go inside the walls up to the wharves, where ship and ear come together. The harbor has a total wharf frontage of four miles, one mile of which is completely occupied by the demands of its large and rapidly increasing business. The average depth of water along these wharves is 18 feet at mean low tide. The rise of the tide is 7 feet and 2 inches, thus giving a depth of over 25 feet at high water, and with the additional improvements projected by the Government, a channel will be secured at the entrance of the harbor of from 300 to 400 feet wide, with a depth of 19 feet at mean high water, and 23 feet at high tides, whereby vessels of the largest tonnage can reach the wharves.

The Government engineers constructed a breakwater 6,700 feet long, part wood and part stone, from Rattlesnake Island to Deadman's Island. On the inner side, and running nearly parallel with the large breakwater, is a smaller one, intended to direct the current.

The distance between San Pedro and Wilmington—3 miles—has been piled in durable fashion by the southern Pacific R. R. Co. The railroad company's wharf is 3,000 feet long. General Banning's ballast wharf is 200 feet long. The Pacific Coast Steamship Co. has a 200-foot wharf. The Los Angeles and Humboldt Lumber Co. have 300 feet of wharf also. The dredging operations have resulted in deepening the channel so steamers can land. The town of San Pedro is a growing one. Wilmington is a small town at the head of navigation. General Phineas Banning, who has made his home there for many years, is well known by visitors to Southern California. He has built and run steamboats, had tugs and lighters, built wharves and warehouses, dug

tance of three miles, and immense wharves have been constructed, as already stated.

The railroad from Wilmington and Los Angeles via Yuma and the Sunset route to New Orleans, forms the shortest transcontinental line from ocean to ocean, and through the most eligible pass, (that of San Geronimo) geographically, in the whole range of the Sierras.

In addition to the transcontinental routes, the various branches of the Southern Pacific to Wilmington, Santa Ana and Santa Monica, and a projected extension from Santa Ana to San Diego, also a projected coast road from San Luis Obispo south to a connection with the Southern Pacific at Newhall, and the assured speedy extension of the Utah Southern to Los Angeles and Wilmington, justify the assertion that her magnificent railroad and maritime facilities, added to her splendid resources, entitle Los Angeles to a rank among the prominent cities of the United States.

The engravings given herewith show in a sketchy style, from drawings by Ed. L. Merritt, some of twenty-six prominent features of the harbor. The lighthouse stands on Point Firmin, on the west side of the bay. Deadman's plane forms the point of the east side. The splendid steamers of the Pacific Coast Steamship Company run regularly to this harbor, carrying passengers and freight, and it is a very pleasant trip to or from this city along the coast, the accommodations being good. To those who want a short sea voyage, there is no pleasanter trip.

They have begun shipping ore from the Hale & Norcross mine to the Mexican mills on the Carson river. A lot of 1,000 tons will be sent and piled up ready for crushing as soon as the present mill run is completed.

The Puget Sound mine produced 22,240 tons of coal last month.

tirely independent of each other for their supply of air, the intake to be in the center and returns at each extremity of district, or the intake in the center and returns immediately on each side adjoining the intake. The latter plan is preferable. In the event of the first or second place on either side becoming foul, a temporary overcast of air-boxes could be adopted to conduct the air from such place direct into the return, thus preventing the danger of causing the rest of the places being made foul also. It would facilitate ventilation by increasing the area of airways, besides preventing the air from polluting more than its own district. Moreover, if an explosion should occur, it would thus be confined to the limits of each district, instead of circulating through the entire pit. (3.) Where broken is following up the whole workings, regulators should be placed at some point where most applicable between the broken and whole workings, and not at the entrance of the intake or return currents. This would prevent any influx of gas from falls in the goaf overpowering the ventilation and backing into the whole workings. Regulating doors should be securely locked. (4.) The ventilation should depend on as few doors as possible, as I consider they are weak points in a mine, but where they are requisite should be self acting, and in situations of importance duplicate ones should be set back in the coal or hung from the roof, for if the doors in use were injured or blown away by an explosion, the duplicate ones could be closed and the ventilation restored, and thus carry away the afterdamp, which is more dangerous to life than the explosion. All stoppings should be strongly built, and of the form of an ellipse, the space between the walls filled up with rubbish; stoppings so built will be better able to resist the force of an explosion than straight walls merely supported by stowing. Air crossings should be built in the form of a semi-circle, and strongly built they will

ly detect any tendency of the air becoming explosive, but speaking as to large and sudden outbursts of gas, it is a question whether any amount of ventilation would prevent an explosion, for, as I take it, the more vigorous the air current the greater chance of a blast, owing to the mixture being more rapidly and extensively formed. Coal dust is a source of danger in mines by its being mixed and carried by the ventilation; it is difficult to effectually deal with it. The use of water damps the air, renders the floor of the mine soft, increases friction, and thus elogs the ventilation. I think the use of salt would be better than water, as by being sprinkled on the floor the moist nature would tend to lay the dust. Combustion, spontaneously, may arise from iron pyrites; phosphureted hydrogen gas will fire spontaneously in air; all substances like these should be sent out of the pit. Brattice cloth should be hung so that the larger space will be for the ingoing, and the lesser for the outgoing current in working places. (7.) For blasting purposes I would advocate the use of the lime cartridge, and the prohibition of powder where safety lamps are in use as previously alluded to; but where it is used, it should be so placed in the line of least resistance, that as little flame as possible will proceed from the drill-hole, to be fired with fuse or detonation machine, so as to gain time for clearance, not to be fired more than one hole at a time and to have reliable men for the work, who should give a proper warning before firing, in case of persons approaching unseen, or in working places meeting each other, or in proximity to other men. (8.) By the exclusive use of safety lamps, for it is greatly on these that the safety of a mine depends.

PRESIDENT RED of the University of California has received a letter of acceptance of the Mills chair of mental and moral philosophy by G. A. Howison, of Wellesley, Mass.

ENGINEERING NOTES.

The Hudson Bay Route.

The opening up of a great traffic route from Manitoba to Europe, by rail to Hudson Bay and thence by steamers, is still agitated with much persistency. A committee of the Manitoba Assembly have been investigating the matter, and among other inducements for the establishment of the route they cite the following: The committee find that in Manitoba, and the States of Minnesota and Dakota, the grain crops of 1882 amounted to upwards of 80,000,000 bushels. One railway alone (the St. P., M. & M. R.) carried southward 13,087,120 bushels of wheat, and 379,010 barrels of flour during the year ending the 30th of June, 1883, and it is safe to assume that had the outlet via Hudson Bay existed, at least one-half of this produce would have followed that channel to the seaboard.

The committee feels justified in assuring that this route would be extensively availed of by the shippers of this country and the neighboring States of America, in consequence of the fact that the distance from Winnipeg to Liverpool via Hudson Bay is 570 miles less than from Winnipeg to Liverpool via Montreal and the Straits of Belle Isle, and 770 miles nearer than via Montreal and Cape Race, while it is 1,032 miles nearer than by way of New York. By sea, Churchill Harbor is 64 miles nearer to Liverpool than is Montreal; and 114 miles nearer than is New York.

Not only is the all-rail route much shorter than by any other line, but nature has provided water ways from the head of navigation of the Red river to the foot of Lake Winnipeg, which can be utilized for over six months in each year, thus reducing the length of railway line to reach Hudson Bay, to within 100 miles.

The committee expresses the opinion that a railway to Hudson Bay will prove a successful and remunerative undertaking, and are satisfied that such an outlet will do more to stimulate production in that province and the Northwest generally than any other enterprise.

AN ELEVATOR OPERATED BY ELECTRICITY. Electricity seems to be slowly, but surely working, its way into practical utility as a motor. The latest item in this direction is its application as a motive power to an elevator in a Spruce street (New York) store.

The building is six stories high, and the elevator is in constant use throughout the day. Loads of 2,000 pounds are often put on the carriage and moved without difficulty. The power is derived from a station two blocks away, and is carried by wires over housetops. A switch on the ground floor connects or disconnects the current, and the movements of the elevator are controlled as in the application of ordinary power. The service is said to cost less than when done by steam, and if this is true the Daft Company sees opening before it a limitless business opportunity. A house in Beekman street is putting in machinery for an electric elevator which will be required to carry up loads of more than two tons. It is urged that large concerns will ultimately set up dynamos of their own for elevator service by day and lighting purposes by night.

RAILROAD BUILDING AT THE SOUTH.—The large introduction of manufacturing industry at the South has very naturally brought about a corresponding activity in railroad building to meet the increased demand for local traffic and for the more extended development of her timber and mineral lands. Many of the finest and most valuable portions of the country are comparatively unavailable on account of lack of transportation facilities, and it is for the interest of every farmer and producer to aid so far as possible, in their construction instead of opposing and driving them away, and thus building up a few favored and sensible localities at the expense of the rest.

THE SAN FRANCISCO AND OAKLAND TUNNEL.—In reply to a query, we would state that Senator Miller introduced a bill into the United States Senate on the 18th of January last granting the right of way to Henry Anderson, his associates and assignees, for the construction of a submarine tunnel between San Francisco and Oakland. The bill gives Anderson the right to select the location of a tunnel and construct three air shafts. He is to have two years in which to commence work. The right is reserved to the Government to transport soldiers, sailors and officers, as well as stores, free of charge, and also to place therein telegraph and telephone wires.

ELECTRICAL ENGINEERS.—The "American Institute of Electrical Engineers" is the name of a new society recently organized in New York somewhat after the models of the three principal engineering societies now in existence in this country, and to advance in a general way the interests of theoretical and applied electricity. That there is an actual demand for an institution of this kind has unquestionably been felt for some time.

OCEAN CABLES.—It is not generally known, but is said to be a fact nevertheless, that out of the nine cables that now stretch from continent to continent under the Atlantic, only three are in working order, and that of these three only one works one way.

USEFUL INFORMATION.

Useful Information.

The following figures are worth remembering, as they will save a great deal of calculation and give approximately accurate results with a minimum of labor:

A cord of stone, three bushels of lime and a cubic yard of sand will lay one hundred cubic feet of wall.

Five courses of brick will lay one foot in height on a chimney. Nine bricks in a course will make a fine eight inches wide and twenty inches long; and eight bricks in a course will make a fine eight inches wide and sixteen inches long.

Eight bushels of good lime, sixteen bushels of sand and one bushel of hair will make enough mortar to plaster one hundred square yards.

One fifth more siding and flooring is needed than the number of square feet of surface to be covered because of the lap in the siding and matching of the floor.

One thousand laths will cover seventy yards of surface, and eleven pounds of lath nails will nail them on.

One thousand shingles laid four inches to the weather will cover one hundred square feet of surface; five pounds of shingle nails will fasten them on.

A REMARKABLE WATER POWER. A lakelet of pure water, about two and a half miles long and one wide, located among the Tolland hills, just outside of Rockville, and 16 miles north-east of Hartford, Conn., affords one of the most remarkable and thoroughly utilized water powers of this country. The lake, called "Snipsie," contracted from the old Indian name "Shenipsit," was originally much larger. The dam, now 30 feet in height, which, with proportionately increased expense, might be doubled, is wedged into rocks like a keystone in an arch, and perfectly controls the sheet of water that flows over it. The full fall now used aggregates 283 feet, and is utilized in falls, varying from 10 to 89 feet, by innumerable mills for silks, satinetts, cassimeres, worsteds, woolen and cotton goods, etc.

PAPER BOTTLES ARE NOW MADE ON A LARGE SCALE in Germany and Austria. The paper must be well sized. The following is said to be a good recipe for the paper: Ten parts of rags, forty of straw, fifty of brown wood pulp. The paper is impregnated or coated on both sides with sixty parts of dehydrated fresh blood, thirty-five parts of lime powder, five parts sulphate of alumina. After drying, ten or twelve rolled leaves are coated again, placed over each other, and then placed in heated moulds. The albumen in the blood forms a combination on pressure with the lime which is perfectly proof against spirits, etc. The bottles are made in two pieces, which are joined afterwards.

CHEAT METHOD OF PRESERVING FENCE POSTS.—A writer in a contemporary journal says: "I discovered, many years ago, that wood could be made to last longer than iron in the ground, but thought the process so simple that it was not well to make a stir about it. Posts of any wood can be prepared for less than two cents apiece. This is the recipe: Take boiled linseed oil, and stir in pulverized coal to the consistency of paint. Put a coat of this over the timber, and there is not a man that will live to see it rot." The experiment is a very simple one, and well worth a trial.

ADVANTAGES OF THE CABLE RAILWAY.—A leading advocate of the cable railway system declares that its main advantages over the whole method of propulsion by horse-power are as follows: First, increased speed; second, the ability to provide transportation to the full requirement of the public, even during what are called commission hours; third, cleanliness; fourth, absence of noise caused by the clatter of horses' hoofs; fifth, freedom from snow blockades in winter; sixth, superior construction of the cars and tracks.

TO OBTAIN A MAHOGANY COLOR.—A wash of one part nitric acid in ten parts of water will impart a stain resembling mahogany to pine wood that does not contain much resin. When the wood is thoroughly dry shellac varnish will impart a fine polish to the surface. A glaze of earmine or lake will produce a rosewood finish. A turpentine extract of alkanet root produces a beautiful stain which admits of French polishing. Asphaltum thinned with turpentine makes an excellent mahogany color on new wood.

AN IMPROVED FISH-HOOK has been invented by a Southern sportsman. About midway up the shaft of the hook he places a small cross bar, which serves three purposes. First, it prevents the fish from swallowing the hook; second, it increases the chances of capture, for the reason that when a fish strikes his nose against the projection it involuntarily closes its mouth and so is securely caught; and third, it prevents the bait from slipping up the hook.

COLORING SILK.—Dr. Koller says that if silk tissues are impregnated with chromate of copper and then exposed to the direct sunshine, various shades of brown may be obtained, and the fabric is rendered waterproof.

A CAMEL can carry a ton. There are 25,000 camels in Kuldsha and Erivan districts, Russia.

The Kalnucks have about 20,000 and the Khirgese not far from 10,000. Camels are bred for their labor principally, but also for their hair and milk. A camel will shear from 18 to 22 pounds of hair. This is worth in the open market about \$2.50 a pound.

ASBESTOS ROPE.—The manufacture of rope from asbestos is likely to become an industry of considerable importance in England, the strength of the article being estimated at about one-fourth that of ordinary hemp rope of the same diameter. Rope of this material of 1½ inches in diameter is stated to have a breaking strength of a ton, and 20 feet of it are calculated to represent a weight of 13½ pounds. Some of the purposes, as enumerated, to which this kind of rope is especially adapted, are theaters, fire brigades and means of escape from public buildings, its advantage being that it will not break and drop its burden if the flame bears upon it. It is made like ordinary rope, and is spun from Italian asbestos thread.

TO SOFTEN HARD RUBBER.—Rubber rings such as are used on fruit cans often become hard and brittle. They can be restored by letting them lie in water in which you have put a little ammonia. Mix in this proportion: One part ammonia and two parts water. Sometimes they do not need to lie in this more than five minutes; but frequently a half-hour is needed to restore their elasticity.

CALIFORNIA stands fifth in the list of States in the manufacture of salt, and it is the only State in the Union where the distillation of salt from sea water is carried on to any considerable extent. This industry has increased rapidly during the last twenty years. The production has risen from forty-four thousand bushels in 1860 to upwards of eight hundred and eighty thousand in 1883.

PAPER INSTEAD OF CEDAR FOR LEAD PENCILS.—They are using paper instead of wood in Germany in the manufacture of lead pencils. The paper is steeped in an adhesive liquid, and rolled around the core of lead to the required thickness. After drying, it is colored to resemble an ordinary cedar pencil. The pencils thus made sell in London at 75 cents a gross.

POWER EMPLOYED IN WALKING.—A recent calculation shows that a man weighing 160 pounds and running a mile in six minutes performs work about equal to that of a half-horse engine, while a walker sustaining five miles an hour for a long day does work equal to that of a quarter-horse engine, and consumes only one-twentieth of the weight of food or fuel.

METAL VS. THE USUAL MATERIAL FOR STRINGED INSTRUMENTS.—Recent experiments with stringed instruments have shown that a much more sonorous tone can be obtained with metal strings than with those now in use, although the labor of playing upon them is correspondingly increased. Steel wires plated with silver or copper gave the best results.

TO MAKE IRIDESCENT GLASS.—Before it is put into the annealing furnace, and while it is yet hot, a vapor is passed over it, the product of a mixture of proto-chloride of tin, carbonate of baryta and carbonate of strontian.

DRESSING FOR LEATHER.—Some one says a good dressing for leather is made of one quart of vinegar, two ounces of spermaceti oil, and six ounces each of molasses and ivory black.

GOOD HEALTH.

"Electrical Medication" Again.

EDITOR PRESS:—Under the head of "electrical medication," we are informed in your PRESS of April 19th that the medical faculty has at last, to some extent, recognized the value of "electrical medication," whatever "medication" may mean in that sense. Of course we are glad to be informed that the faculty are following along, however slowly, after the discovery of facts known and practiced outside of the profession for so many years. I should not deem the article referred to as calling for attention except for the quotation with which it closes, which gives at a glance the true inwardness of the publications made by the medical faculty, viz: "Electricity is simply force, and like other therapeutic measures must be rightly applied if we expect to accomplish much good with it. To be sure a mere novice may relieve and cure people with electricity, knowing but little about what he is doing, but this is accidental, and such ignorant practitioners are liable to do as much harm as good."

The statement is false. Who has been injured by the ignorant use of electricity as applied for remedial purposes? Such a remark would be truthful applied to many drugs used by the profession, for not one family in a hundred whose members have been treated are free from their visible effects. Finding that electricity has found its own way into public favor as a harmless remedy, to the extent of greatly interfering with their practice and profits, the faculty seem desirous to take entire charge of it and create the future impression that it is hurtful, except in the hands of the profession. Some years ago the writer was in San Francisco and had been for two weeks hardly able to get his coat on without aid, on account of rheumatism in the shoulder. Passing down Washington street, near the post office, one day, a friend invited me to test my endurance on one of the dime-show batteries which were exhibited on the street. I did so and passed on, not thinking of the rheumatism till next morning, when, to our surprise, we had no trouble in putting on our coat. The rheumatism was gone. Of the hundreds who handle electricity and magnetism in the ordinary way have never known any one to be injured, but have known of many being relieved from great suffering and restored to health. The public are not to be hoodwinked out of their common sense in regard to medicine and the common laws which govern health by publication of nostrums by the faculty, and the sooner the medical writers of books understand us, the better for them. No amount of legislation can force health-destroying drugs into use; no amount of sophistry can disguise a false statement like the one referred to. E. M.

While in part, at least, the above opinion may be correct, the fact that "E. M." has never seen cases of harm from inexperienced practice should not lead people with sensitive, weak or delicate conditions to use the battery with impunity.

Tar Smoke for Diphtheria.

Ruth Lockwood, the nine-year-old child of Thomas Lockwood, a compositor in the *Pines* office, became violently ill with diphtheria on Tuesday night. She was so weak that it was deemed dangerous to try tracheotomy, or cutting open the windpipe. On Thursday Dr. Nichols of 117 West Washington place, who was attending her, received a copy of the *Paris Figaro*, which contained a report made to the French Academy of Medicine by Dr. Delteil. Dr. Delteil said that the vapors of liquid tar and turpentine would dissolve the fibrinous exudations which choke up the throat in croup and diphtheria.

Dr. Delteil's process was described. He pours equal parts of turpentine and liquid tar into a tin pan or cup and sets fire to the mixture. A dense resinous smoke arises, which obscures the air of the room.

"The patient," Dr. Delteil says, "immediately seems to experience relief; the choking and rattle stop; the patient falls into a slumber and seems to inhale the smoke with pleasure. The fibrinous membrane soon becomes detached, and the patient coughs up micrococci. These, when caught in a glass, may be seen to dissolve in the smoke. In the course of three days afterward the patient entirely recovers."

Dr. Nichols tried this treatment with little Ruth Lockwood. She was lying gasping for breath when he visited her. First pouring about two tablespoonfuls of liquefied tar on an iron pan, he poured as much turpentine over it and set it on fire. The rich, resinous smoke which rose to the ceiling was by no means unpleasant. As it filled the room the child's breathing became natural, and as the smoke grew dense she fell asleep.—*New York Times*.

ARE BAKING POWDERS UNHEALTHY?—A writer in the *Journal of the American Medical Association* avers that there is no doubt that baking powders, even the best of them, are damaging to health. He says: To make the matter clear, it may be stated that the average baking powder is composed of bicarbonate of soda, cream-tartar, and starch, with a possible admixture of other things. The continued use of even this purest baking powder will affect the system seriously, commencing with only a slight derangement of the digestive organs, which gradually becomes chronic, changing the secretions of the stomach necessary for digestion (muriatic acid); in fact, altering the whole chemistry of the human stomach. The continued use of alkalis in any form injures the health. Look at the alkali country west of us where the alkali is found in the drinking water. The same dangers will arise from the persistent alkaline medication of our daily bread. The various forms of dyspepsia, bladder troubles, Bright's disease, and consumption—the newest researches speak about a wrong proportion of the alkalis in this disease—are only too often caused by the employment of this modern substitute in place of the old time-honored, common sense practice of using yeast.

DEATH.—Death is a part of life. It is nothing more than the negation of life. If life, therefore, be no general good, death is no general evil. Who shall decide it? Not women and children, but wise men. Thales, the chief of sages, held life and death as things indifferent. Socrates, the greatest of all philosophers, speaks of death as a deliverance, and so does Cicero and Solomon, who had tasted all the sweets of life, condemns the whole as vanity and vexation.—*Fielding*.

HEALTH.—O blessed health! thou art above all gold and treasure; 'tis thou who enlargest the soul, and openest all its powers to receive instruction, and to relish virtue. He that has thee has little more to wish for, and he that is so wretched as to want thee, wants everything with thee.—*Sterne*.

TO REMOVE INDIA INK.—Blister the part with a plaster a little larger than the mark; then keep the place open with an ointment for a week; finally dress it to get well. As the new skin grows the tattoo will disappear.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

VOLCANO.—Amador *Dispatch*, June 7: Mining interest has been rather slack for some time past. Gillick & Phillips are at work on their claim, and are taking very rich rock out. The Acme mine has started up; the mill is running day and night. Capt. Hopkins is here at present. The tunnel Co., are at work making preparations for cleaning up.

LAMBING GRAVEL CLAIM.—Amador *Ledger*, June 7: Work is still being prosecuted on this gravel claim near Irish Hill, Lone valley. About 30 Chinamen are working on shares, and making average wages, so we are informed. In addition to this, Mr. Lambing, the owner, is preparing to work the same on an extensive scale. The deposit is in a former creek bed, with 20 ft of soil to be stripped off before the pay-dirt is reached. One of the main difficulties has been to control the great flow of water. This has been mastered by putting in two powerful pumps in the pit already sunk to the bedrock to the depth of 35 ft. This, it is believed, will enable the 100 acre basin to be worked without serious obstacles as far as water is concerned. But the most formidable difficulty has been, and still is, to get rid of the enormous quantity of non-gold-bearing top dirt. At first horse-power scrapers were used, but these were speedily discarded as too slow and costly. After careful study, Mr. Lambing concluded that a derrick operated by steam power is the most feasible plan of overcoming the difficulty. The necessary machinery to this end is now being made at Knight & Co's foundry.

SUTTER CREEK.—Affairs at the Mahoney mine are beginning to assume a more lively appearance. The water is now out below the 800 level, and will remain that way until the shaft is repaired, which is expected to take about a week, when the remainder of the water—about 100 ft—will be taken out. This can be done in a couple of days, as there are no tunnels in this distance. After the water is out, the first work undertaken will be sinking 100 ft at least. This is to be let by contract to the lowest bidder. Drifting in the 800 level is likely to be commenced about the same time, with a view to connect the Mahoney with the Wildman, thereby giving good ventilation. A few additional men have been put to work, and in the course of a week or two many more will no doubt be put on. There are plenty of idle men here, however, to supply the demand. Good rock is reported to have been struck in the Lincoln by Mr. Stewart, and is being hoisted to the surface. The extent of the ore body remains to be seen.

Alpine.

STARTED UP.—*Monitor Argus*, June 6: The Illinois & California mine, in Raymond district, started up this week. Mr. Coleman has charge of all operations at the mine. Very rich ore is being taken out of the Polar mine this week. The vein is steadily increasing in size and richness. Specimens of the ore that were shown to us exceed in quality any we had ever seen before.

Calaveras.

VALLECITO.—*Cor. Mountain Echo*, June 7: Mining operations in the Balaklava district are lively in the extreme. All the claims there are being actively worked, and as near as I can learn, results are generally favorable. It is reported that Mr. T. Keyser, has sold his one-third interest in the famous Keyser mine to Luke Sanguinetti. It is also said the owners of this mine have developed an immensely rich body of gravel. That their prospects may continue favorable, is the desire of all, as the Co. is deserving of a valuable mine for the vast amount of labor they have done in opening the mine. Tyler & Co. have developed their mine sufficiently to insure them a big summer's work. It is said that a washup recently made in the Moffitt drifting mine, yielded an average of ten dollars per foot. This mine is supposed to be the richest placer mine in this vicinity. Quartz prospectors are quite reticent at present.

QUARTZ VEIN.—Mr. Messer, who is working the Old Parnell mine, near Smith's Flat, recently discovered a quartz vein about six inches in width, from which he has frequently obtained as high as \$10 to the pan. We were shown a specimen of the ore being extracted from the mine, which is immensely rich.

El Dorado.

DRILLS.—*El Dorado Republican*, June 7: H. H. McClellan, Supt. of the Melton mine at Grizzly Flat, was in town this week, making arrangements with H. S. Mory for the purchase of two National drills for use in the proposed new tunnel in his mine. An air compressor is expected in Shingle Springs from Virginia City to be used in running the drills. It is a four drill compressor, and weighs 5000 pounds; but the full capacity will not be used at first.

THAT NEW PUMP.—The exact size and capacity of the new mining pump at work at the Lamoille mine, of which mention was made as being one bound to commend itself to mining men, is as follows: Diameter of steam cylinder eight inches. Diameter of bucket six inches. Diameter of plunger four and one-fourth inches. Ten inch stroke. The capacity is 50 gallons per minute. There is a suction condenser attached, which does away with the nuisance of escaping steam up the shaft.

Fresno.

COARSE GOLD.—*Cor. Fresno Expositor*, June 7: A French Co. has taken hold of Quartz Mountain, and things in that section are getting very lively; they have commenced a survey from the San Joaquin river for a ditch to bring in water a distance of twenty-five miles. The Last Chance mine, owned by McKenzie & Rule, is opening up well; they keep their mill running steadily. The Texas Flat mine is paying well. The Hawk-eye mine, owned by Lang & Co., keeps its mill running day and night, and is turning out considerable bullion. The Morning Star mine, owned by Hardman & Mandeville, will be a bullion producer at no distant day. The Constitution mine, owned by Baker, Crane & Anderson, is looking well. They have a vein of paying ore at the bottom. The Enterprise Co. are putting up an air compressor and Burling drill. The snow is going off from Mt. Raymond, and prospectors are beginning to go into that section which, no doubt,

will be another bullion producer for Fresno county. Los Angeles.

SAN GABRIEL CANYON.—*Los Angeles Times*, June 7: Mr. A. S. Robbins returned a few days ago from a visit to the Kelsey mine, in which he, with several other gentlemen, are interested, bringing with him some selected specimens of ore, which are almost fabulously rich. Some of the specimens are as full of native silver as to be almost pure silver, and could a ton be collected, would run at least \$25,000. He does not wish it understood that the ledge, or any great portion of it, is so fabulously rich, but the numerous specimens brought in show that the mine is very rich. When placed upon a grindstone the specimens show a polished surface of pure silver. The Kelsey mine is the property of the San Gabriel Mill and Mining Company, and is located in the San Gabriel canyon, about twenty-five miles from Los Angeles. It is situated on the mountain side, at a considerable elevation above the bottom of the canyon, and the company has constructed a trail, so that they can have communication with the mine at any stage of water. The ledge has an average width of three feet, and the ordinary grade of ore runs from \$20 to \$40 per ton. A good force of men are at work running a tunnel and opening the mine, and if the prospect continues as favorable as at present appearances indicate, the company will shortly erect a mill for the reduction of the ore.

Mono.

BODIE CON.—*Bodie Free Press*, June 9: During the week 105 tons of ore were reduced at the Bodie Tunnel mill and 128 tons at the Bodie Con. mill. The average assay value of the pulp was \$16.06, and of the tailings \$2.43. They stopped crushing at the Bodie Tunnel mill on Wednesday morning, the 4th, therefore they will have but two and a half days' run at this mill and the week's run at the Bodie Con. mill to ship this week. They commenced working the one-half of the Bulwar-Standard mill late on Friday evening. The ore extracted during the last week is from the Gildea, Vulcan, Fortuna and Bruce veins. They are extracting ore from the Fortuna vein, 550 ft (Lent shaft) level. They have started a raise on the Fortuna from the 500 ft Jupiter level, and are getting some fair ore. They are breasting on the second incline level and on the 432 foot Bodie shaft level, Fortuna vein, and also on the 306 level on the Fortuna and Vulcan veins. The rich chimney of ore still continues as they raise on it north of No. 1 raise, on Fortuna vein, from 300 foot level. They are stopping on the 206 foot level on the Gildea, Vulcan and Bruce veins. The ore breasts are all looking well. They will quit to-day hauling to the Bodie Con. mill and when the ore which is at the mill is reduced they will commence to work the tailings and concentrations that have been saved from the present and former workings.

BODIE TUNNEL.—They advanced 20 ft on the vein on the 200 foot level.

HUMBOLDT HILL.—The Humboldt Hill mill of twenty stamps, situated near Aurora, started up last Monday.

MONO.—On the 260 foot level east crosscut is in 324 ft; a gain of 15 ft during the past week; passed through blue formation into red porphyry. The 400 foot level crosscut, east on the Bruce vein, is in a distance of 6 ft; a gain of 17 ft during the past week.

PLACERS.—*Homer Mining Index*, June 7: County Supervisor William Wetherill has made preparations to begin mining operations in Rancheria Gulch, which leads from the Sinnamon Cut in the Old Mono diggings eastward, emerging into Mono Lake valley through a narrow gorge about one mile west from Hector's station. This gulch has long been known to be rich in placer gold, but the drawback has been the presence of quicksand at depth, the absence of water for washing and the supposed impossibility of drainage. Mr. Wetherill, however, has succeeded in reaching bedrock, and is satisfied, that he can drain the diggings by a short cut through rimrock near the mouth of the gorge. It is now understood that the San Francisco attorney of the old J. D. Wilson Detroit Copper Company has settled up such bills of that company as had been rendered unavoidable by process of law, and that work will be resumed on the property by the old company at the expiration of the six months from the date of Sheriff's sale of the property. The Lake canyon road to the May Lundy tramway is now in good condition, and the repairs to the tramway are nearly completed. The underground force is being steadily increased, and will probably be run up between 150 and 180 men (May Lundy and Lake View) for the summer. The coming week will see both mine and mill under full headway. The Bryant is being steadily worked, and it is now reported that Supt. James McDonald, who went to Hawthorne last Saturday, to consult with Hon. Pat. Reddy, one of the largest owners of the mine, extended his trip to San Francisco to see about getting a mill. Meantime the two-stamp mill in Lake canyon will be employed on Bryant ore, of which there is a large quantity, and of high grade, in sight on the 130 level. The Gorilla is employing quite a number of men on repairs and preparatory work, besides those engaged on contract works in the mine. The company's reduction works have been running during the week on a large pile of ore. The Virginia creek hydraulic works were started up on Sunday morning last, under a head of 400 inches of water. Work is progressing favorably in the Great Sierra tunnel, Tioga district, the rock still being soft and favorable. It is now quite probable that the Sheepherder lode will be reached by or soon after the close of the present month.

Nevada.

CLEANING BEDROCK.—*Tidings*, June 7: W. J. Madden, of Smartsville, is in town, and he reports Smartsville as being very dull, owing to the mines being closed down. He says, however, at present many men are engaged in cleaning up bedrock in expectation of making it lively. Mr. Madden has been engaged in taking out the flumes of the Golden Gate mine, and has finished cleaning up enough to pay all expenses and also all the back labor accounts against the mine.

BANNER HILL.—*Tidings*, June 4: Mining in the vicinity of Banner mountain is "looming up," as it were, and several active and encouraging prospects are being carried on up there. The North Banner, mostly owned by Grass Valley parties, is improving constantly. The ledge has been quite small of late, but now it has widened out considerably and gives every indication of being permanent.

The company will soon begin the construction of a water ditch at the mine, by which free water may be obtained the entire year. When this ditch is completed, five additional stamps will be placed in the mill. The recent enlargement of the ledge enables the miners to take out quartz enough to keep the mill running day and night. Two Frue concentrators now do the work of saving the valuable part of the pulp at the Banner. Near the North Banner, and on the opposite side of the mountain, is a prospect known as the Yosemite, which is said to contain the richest rock ever found in that part of the country. The ledge is over a foot in thickness and was worked to a depth of 50 ft, gold being found in many portions of the rock, and the dirt around it being filled with coarse gold. At the depth attained water drove the miners out, and they being unable to erect machinery on the property had to abandon work until other means could be devised. The men who own the property told several Grass Valley gentlemen of the case and showed them some of the quartz. The Grass Valley men immediately took stock in the enterprise and started a tunnel on the lower side of the hill, for the ledge, and is now in about 260 ft, and will tap the ledge at about a distance of 20 ft more. The tunnel has been run with exceeding difficulty, as the rock is very hard, being serpentine in nature, and had to be blasted every inch. Peter Irving is one of the original owners of this location, and Mr. Dunnington is now associated with him in running the tunnel; two other men are also employed to assist them. It is expected that the ledge will be tapped some time in July.

DRIFT MINING.—*Transcript*, June 11: When Hirschman & Co. quit hydraulicizing this season they were in a rich part of the channel, the gravel in the face of the bank showing well in gold. Monday they began running a tunnel into the deposit, and will give a fair trial to the drifting process. The indications are that the experiment will prove successful, as the channel in this claim is not deep, and the gold is perhaps coarse enough to be principally concentrated near bed-rock. Drift mining has not paid as a rule heretofore in this section, but if the Hirschman can be made to pay by it other miners will be encouraged to give it another trial. The tunnel in the above claim runs north. Starting from the face of the same bank, and near by, J. Garthe & Co. are running in a westerly direction to tap the lead in the Knickerbocker claim. Their work has been greatly facilitated by the discovery of an old tunnel that merely needed cleaning out part of the distance, and they are now in about 75 ft. To-day they expect to be fairly into the channel. They are putting in a well built track, large and strong cars, and making extensive preparations for the thorough prospecting of their ground. If everything goes well, they will increase their force of miners in a couple of weeks.

NEW YORK HILL MINE.—*Grass Valley Union*, June 10: In addition to the good quartz recently taken out of the tenth level south of the New York Hill mine by tributaries, some good prospects are being obtained on the eleventh level north, which are expected to lead up to a body of good ore.

GOOD CLEAN-UP.—*Mansau & Co.* had a clean-up a few days ago at Perrin's mill of 42 loads of quartz from the Slate Ledge mine, which yielded \$52 per load.

MURCHIE.—*Nevada Transcript*, June 6: At the Murchie mine the full complement of 18 stamps are running regularly and with reasonably good results. Driftings being done on the 600 and 700 foot levels. Some rather high grade ore has been taken lately from Alice Bell ledge, 18 or 20 tons, having been sold on the dump to O. S. Maltman for \$45 a ton. Considerable ore that will pay about \$15 a ton is being taken from the same ledge. At the Wilson Ranch an upraise is being made from a crosscut of the mine drain tunnel, and very encouraging indications are met with. Five or six men are employed and the work is making good progress. The management expects to erect machinery on the claim this summer. Ole Helgeson has recommended tunnelling the south side of Big Canyon creek, opposite the Norway mine. Mr. Helgeson while working the same grounds a few years ago made such rich developments that we are told that he was offered \$8,000 for the property, but refused to sell, as he thought he could get more out by working it himself.

BANNER MOUNTAIN.—The ledge of the North Banner has widened out and otherwise improved lately, and the owners feel quite encouraged. A ditch is soon to be run to the mine to give free water all the year, and then five more stamps will be added. The mill now runs day and night, and the sulphurets are saved with two Frue Concentrators. The *Tidings*, from which we get the item about the North Banner also has the following relative to a rich strike on the other side of the mountain. It is called the Yosemite, and is said to contain the richest rock ever found in that part of the country. The ledge is over a foot in thickness and was worked to a depth of 50 ft, gold being found in many portions of the rock, and the dirt around it being filled with coarse gold. At the depth attained water drove the miners out, and they being unable to erect machinery on the property had to abandon work until other means could be devised. The men who owned the property told several Grass Valley gentlemen of the case and showed them some of the quartz. The Grass Valley men immediately took stock in the enterprise and started a tunnel on the lower side of the hill, for the ledge, and it is now in about 260 ft, and will tap the ledge at about a distance of 20 ft more. The tunnel has been run with exceeding difficulty, as the rock is very hard, being serpentine in nature, and had to be blasted every inch.

Plumas.

ROUND VALLEY.—*Greenview Bulletin*, June 4: The Old Round Valley ledge is now being worked by J. S. Drury. The upper tunnel has been run 350 ft. and is in a chimney of pay ore. The ledge is about seven feet wide and is between well defined walls. The next tunnel penetrates the mountain at a perpendicular distance of 250 ft below the upper tunnel. It is now in 600 ft, but not far enough to reach the first Wiles chimney by 200 ft. If the chimneys go down, and there is no room to doubt that they do, backs of from 700 to 800 ft may be secured by running another tunnel. Mr. Drury is confident that he has a valuable piece of property.

THE SUNSET.—The drift which was started two weeks ago has reached the ledge 150 ft from the prospect on top. Drifting on the ledge is now in progress. The ore removed prospects well and is being run through the mill. In an easterly direction from the Firminstone works is a ledge 7½ feet wide.

It was recently found, and prospects uniformly and gives satisfactory milling returns. From two ledges in addition to those mentioned, good ore is run through the mill. For the work done on the property, the showing which this mine has already made is very gratifying. The company have a ten stamp mill. The mill is well arranged. The location of the mine is such that great depth can be had at various points with short tunnels. G. P. Cornell and Will Blood arrived from San Francisco to-day. Mr. Cornell has possession of the Indian Valley mine now, and it is to be hoped he will begin work on the property soon. D. McDonald begins work to-day running another tunnel on the Bonanza ledge. Thus far the ore has paid well. Work on the Lucky S. ledge is progressing satisfactorily. Geo. Brandt is prospecting a ledge by crushing the ore in an arrastra. Johnson & Bicknell are running their hydraulic claim, fair prospects.

PUMPS BROKEN.—*National*, June 7: The pumps in the Riverdale mine let down again a few days since, and the drifts and shaft are again full of water. Both pumps quit at about the same time, and the water raised over them at once. The owners are arranging to put in new machinery, and this time it will be of such good capacity that there will be no trouble in handling the water. The gravel was improving rapidly when the pumps stopped, and the mine was looking better than ever. The east drift was nearly into the deep channel, which is thought to be very rich, and three days' more work would have bottomed it. It will be there, however, when the new machinery comes, and then the owners will be in better condition to handle it.

Placer

IOWA HILL.—*Placer Herald*, June 7: A. D. Bowley, of Iowa Hill, was in Auburn a short time last Wednesday, and in answer to a question as to how the times were at the Hill, he remarked: "Well, we are taking out the nuggets." He then, as proof of his statement, proceeded to exhibit several hundred dollars worth of handsome washed gold specimens, ranging in value from about \$1 to nearly \$100, recently taken out by him from the Golden Gate drift mine, located near Iowa Hill. He thinks without doubt he is on the famous Succor Flat channel, and the appearance of the gold goes to prove that he is. The old Succor Flat drift mine is working quite a force of men and is still doing very well. Other mines in the district, he reports as panning out first rate, which gives to Iowa Hill and vicinity quite an active appearance and an encouraging outlook.

San Bernardino.

MINING SALE.—*Calico Print*, June 7: R. H. Lewis has sold his claims the Mayflower near Old Woman springs to Dr. Thompson for \$6,000. Mr. Lewis will receive \$2,000 in a day or two, the balance to be paid within thirty days. Mr. Lewis will assume charge of the development shortly.

DISTRICT DIVISIONS.—A new mining district has been formed called the De Soto. It is divided from the Lava Bed district by a line which runs from the railroad to a point five miles north-west of the Morning Star mine and taking in the Hot and Old Woman Springs.

PROVIDENCE DISTRICT.—Mr. Thomas Ewing Superintendent of the Providence mine, called at the *Print* office Monday. He reported everything in first class shape, and said that the mill had been shut down for five or six days to repair worn machinery. This is the first stoppage of the mill this year. The Providence people have made a practice of keeping the ore ahead of the mill, and they have about a half a million still lying on the dumps. The Alhambra mill at Hawley has closed down for a few days in order to make the necessary changes in removing the present crusher and replacing the same with five stamps which Gov. Dagget has purchased in San Francisco.

SAMPLING WORKS.—The sampling works commenced operations last Wednesday. We learned from Mr. Olmsted that the machinery works smoothly and satisfactorily and that the works are now prepared to sample all kinds of ores. It will not be necessary now for mine owners in Calico and neighboring districts to ship their galena, copper, silver, or refractory ores to a great distance for treatment, and to find a market for them, for they now have excellent facilities at home for disposing of their ores at a good price. Since the mill began several lots of high grade ore have been sampled, giving from 800 ounces to 2,500 ounces to the ton in silver. The outlook for a busy summer for the mill this year is quite encouraging.

Shasta.

BRUNSWICK MINE.—*Trinity Journal*, June 7: In company with J. R. Balch and P. A. Lefren we paid a visit to the Brunswick Mine in French Gulch District on Saturday last. The Company were unfortunate in having their cabin, blacksmith-shop, tools, etc., destroyed by a forest fire last summer, and work has been retarded this Spring by their being compelled to make an entirely new start. However, everything is now in order for work and they were to commence taking out ore from the incline on Monday last, Chas. N. Creamer being in charge as foreman. This mine is said to be the best prospect in that section of country and lies in the best possible location for working. Fifty to sixty tons of ore are now on the dump which is variously estimated at from \$50 to \$100 per ton and it is thought two men can add to this at the rate of five tons per day. The ledge is well defined, four feet in width and has been traced about 800 feet on the surface; there is an incline of forty feet, a perpendicular shaft of 104 feet and a tunnel tapping the lode at the bottom of the shaft. Nearly all the stock of this Company is held in Trinity County and the owners propose to run the mine for all it is worth. Should the pay chute continue as it now promises, a mill will be erected within the next few months.

Sierra.

THE HOPE QUARTZ MINE BONDED.—*Sierra Tribune*, June 7: G. V. Williams & Company have bonded the Hope quartz mine at Minnesota for a term of six months. Mr. Williams has already put six men at work in clearing out the old tunnel. When the face of the tunnel is reached a shaft will be sunk and crosscuts run on the ledge both east and west. Work will also be carried on in the stopes. The Hope claim is adjacent and an extension of the Plumbago, which mine has been often referred to in these columns. The Hope property is very highly spoken of by parties who are capable of judging a good mine.

Among the owners are James McNaughton and J. T. West, of Forest City, and Al. Bixby and J. H. Clute of Alleghany.

Siskiyou.

THE McCONNELL MINE.—Yreka Union, June 7: Wm. McConnell's mining claim, on Klamath river, will yield handsomely this year, and is in better working condition than any similar claim in the county. A new pump has just been put in, which, in connection with the old one, will afford the best of drainage, and the two electric lights to be used will be in operation in a short time, but until then no night work will be done. In a run of three days, a short time since, nearly \$500 were cleaned up, and the work was not fairly under way.

BUCKEYE FUR CLAIM.—Dogget and Lasconce have just put in a new derrick in their claim two miles above Oak Bar, and are working 11 men.

JACKSON AND CRARY left good prospects in their claim on the Klamath, near Oak Bar, last fall, and have resumed work this summer, where they left off with every indication of enjoying a profitable season.

COLE AND MOTT, on the Klamath, have just put a new wing dam, and made other improvements sufficient to insure them a good run. After twenty-five years, James O'Connell, of Douglas county, Oregon, has returned to O'Connell's Bar, on the Klamath river, to develop a claim which he prospect in early days, and which has never been touched by a pick during that period. Barton and Leduck are putting in a wing dam in the Klamath river, four miles below Oak Bar, and are encouraged in their work by the knowledge that the China claim above paid exceedingly well last season. The Klamath quartz mine, located in the Salmon district, and formerly owned by Lieut. Governor Daggett, is coming to the front. Last month the company realized \$600 over and above running expenses, and the outlook for this month is far better.

Trinity.

EASTMAN DISTRICT.—Trinity Journal, June 7: John W. Blakemore tells us that the Blakemore mine continues to pay regularly and well. From Sam. Hurlburt we learned that Newman & Hurlburt had lately made a \$500 clean-up from their mine in this district and consider they have a good thing. Although 14 tons of stuff was run through the arastra it is estimated that there was not more than 5 tons of quartz in it all. We also learned that Hickey had found quartz again in his tunnel and that other workmen on Eastman and Jennings gulches had good prospects.

CROWDING WORK.—From Mr. E. M. Benjamin, Superintendent of the Hayes Red Hill Gold Mines, we learn that work on the ditch, flume, iron pipe and mine is being pushed with the utmost vigor, 50 men being at present employed in the various work. It is intended to have the Canon creek water on these promising mines at the earliest possible moment and no effort or expense is being spared to accomplish this desired end at the earliest day practicable.

DEADWOOD DISTRICT.—We passed over the Deadwood road last Saturday on the way to French Gulch and took the opportunity presented to visit the Enterprise and Barted mines, from both of which are obtained very rich specimens. The Enterprise is the property of John E. Gibson, but is at present being worked by Messrs. T. C. Cox and M. Chadbourne who have arranged for a half-interest in the proceeds. Mr. Gibson is running both his arastras on Enterprise ore and the prospect is very flattering, indicating that all parties concerned have a large fortune in sight. The Barted belongs to Frank & McDonald, who are getting out large quantities of rich ore and are also engaged in the erection of a five-stamp mill for crushing it. During the spring three runs were made with their arastra on Barted rock and the average result was \$775 per ton. When the mill is in running order and set going they will take out money very rapidly. Both the mines referred to are in rich ore deep down and with every indication of holding out indefinitely. We had no opportunity of visiting other mines on Deadwood, but learned that Frick & Davis, Shafter and others of the older mines were doing well as usual, and that the later discoveries were most encouraging. Paulsen & McGregor have just started up their arastra and are anxiously awaiting results. Davidson is getting his Cannon-Ball mill erected and will soon commence crushing on Vermont ore. Lambeth has his reduction-works started and judging from the initial smoke it is probable Deadwood will soon be enveloped in a cloud. Everyone we met in Deadwood were cheerful and hopeful, as they have reason to be, for never before has so much money been taken out of a quartz mining district for the work done, and developments in every direction show that the future will confirm the most rosy views of those who are fortunately possessors of interests in that district.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, June 7: Are now daily shipping ore from the 200 level to the Mexican mill, on the Carson river, where a crushing of 1,000 tons will presently be made. On the 2300 level are easing timbers at and about the station. No work is being done on this level at the points where ore was found, but a beginning will probably soon be made, as the Savage bulkhead is now completed.

YELLOW JACKET.—The boilers from the works at the new shaft have been brought to the works at Gold Hill and are being set up in place of the old ones. Considerable exploring work is being done at several points, and some paying ore is being encountered.

BEST AND BELCHER.—Good progress is making in the northwest drift recently started on the 2500 level. The east crosscut on the 200 level is still encountering a considerable amount of quartz. It is being advanced into a very favorable formation.

UNION CON.—Are drifting in east crosscut No. 4. There is some water in the drift, but not sufficient to prevent going forward with it. The ground is a mixture of clay, quartz and porphyry, of a promising appearance.

MEXICAN.—The winze started on the 3100 level is now down to the 3000 level. It is in material so soft that it will be necessary to go some deeper in order to find firmer ground in which to open a station.

UTAH.—The southeast drift on the 1950 level has been advanced 33 ft, and continues in vein material,

with a considerable amount of quartz. As yet this quartz carries no metal of value.

ALTA.—Good headway is making in the west drift on the 2150 level, though the rock is hard. The diamond drill has been started east from the face of the east drift on the 2150 level.

IMPERIAL.—The lateral drift, now in Alpha ground, is encountering a considerable amount of quartz, but thus far it is not found to carry metal in paying quantities.

SIERRA NEVADA.—The north drift on the 3100 level has made good progress during the week. The face is in vein material of a favorable character, and the ground is dry.

COMBINATION SHAFT.—Are making good headway in cutting out the bob-station at the 2700 level and in opening out the pumping and working station at the 2900 level.

GOULD AND CURRY.—Two east crosscuts are being run on the 1200 level, in ground that shows a good deal of quartz of a promising appearance.

ANIES.—Some low grade ore is being extracted, and a good deal of work is being done in the way of exploring and prospecting.

CALIFORNIA.—The east drift on the 2000 level has been advanced about 30 ft. Have completed repairing the C. and C. joint shaft.

CON. VIRGINIA.—The east drift on the 2000 level has been advanced about 30 ft. Have completed repairing the C. and C. joint shaft.

CROWN POINT.—About the usual amount of low-grade ore is being extracted and sent to the mills on the Carson river.

CHOLLAR.—Are preparing to place a stone bulkhead in the drift on the 26 level, that in the Savage having been completed.

BELCHER.—About the usual amount of low-grade ore is being extracted on the old upper levels.

SCORPIO.—The west drift in the 500 level is still in vein material of a favorable character.

SAVAGE.—The bulkhead in the north drift on the 2600 level has been finished.

OPHIR.—Are sorting out fillings in the various drifts on the 250 level.

Belmont District.

LEACHING.—Belmont Courier, June 7: Work on the addition to the Belmont Mining Company's leaching works is progressing rapidly. They are building a foundation of stone. The mine is looking very well and considerable good ore hoisted to the surface daily. Peter Bartell and William Hall are sinking an incline on their mine north of town. The incline has already attained a depth of about 20 ft and some good ore is exposed at this depth. They will continue the work of sinking until they strike the main ledge.

Bristol District.

BULLION.—Pioche Record, May 31: The Day Company get their bullion hauled to the terminus of the Utah Central for \$12 per ton. There are some pretty copper specimens from the lead well of the furnace on exhibition at McCarter's. Foreman Walsh is about to erect a bath-house, adjoining the furnace, for the benefit of the employees. There seems to be considerable dissatisfaction among the employees at the furnace, and a strike for the old wages is anticipated. Johnny Blair put six men to work during the week—three on the Tempest and three on the Iron mine—and it is more than probable that a large force will be put on the former claim inside of a few months.

Eureka District.

THE CONNOLLY.—Eureka Sentinel, June 2: The hoisting machinery at the Connolly mine has been thoroughly overhauled, and steam was got up on Wednesday last. The mine is looking better in every respect than it has for years past. Yesterday the contractors struck into a thick stratum of soapy clay, which has the appearance of the hanging of an ore body, but no assay of it has yet been made. The tributaries, who are working in the bottom of the mine, will make a shipment of ore during this week.

Schroeder District.

A NEW CAMP.—Cor. Exchange, June 5: C. E. Ferguson, well known as a prospector and miner of many years' experience, while prospecting in the vicinity of Schroeder district in July of last year, discovered some very favorable indications of mineral. Making a thorough examination of the ground, and having various samples assayed, he became convinced that the ground was valuable. A number of locations were immediately made, and sufficient development work done to test, in a measure, the character and extent of the discovery. The work already done, though of limited extent, would seem to prove that this will be one of the most productive camps in Eastern Nevada. The prospects run from \$40 to \$300 in silver and 40 per cent lead per ton, with a trace of copper and antimony. Most of these claims have been prospected from 10 to 40 ft in depth, and all show good indications. Everything is promising, and the owners enumerated above are very hopeful. This camp is about 10 miles from Carlin, in a south-westerly direction. It is located near Ferguson mountain, on the old Tuscarora road, along what is known as Maggie Creek—a stream of water sufficient to supply all the needs of the camp in winter and summer. The mines are owned principally by poor men, who are most of them experienced miners. Goodhue & Co. have erected a furnace at Palisade for smelting ores from their mines. A road is also being constructed from Maggie creek to the top of Ferguson mountain for the purpose of transporting ore from the mines to Palisade.

Tybo District.

GOOD ORE.—Belmont Courier, June 7: Work is progressing finely in the 2 C. mine at Tybo and good ore is being extracted from this famous mine.

ARIZONA.

BONANZA MINES.—Quijotoa Prospector, June 4: The situation this week is highly flattering. In tunnel No. 4 considerable quartz has been encountered, which gives good assays. In south drift of tunnel No. 2 some very fine ore has been cut, which thoroughly demonstrates the existence of a vein of ore at a depth of 400 and odd ft. The wise-ones, who predicted that it would never go down, have, Arab like, "folded their tents and stolen away"—it is to be hoped, never to return. There are, on good careful judgments, several millions of dollars worth of ore

exposed on the surface of the bonanza properties, and with a depth of over 400 feet to add to the surface, showing the aggregate is too astounding even to place in figures. The question of the town of Quijotoa becoming a populous one is definitely settled. It is merely a question of time. It is safe to say that Quijotoa, before next Christmas, will have a population of 2,500. For the benefit of our contemporaries we will state that the question of the erection of a mill on once has not been settled, but is now under consideration by the Board of Directors.

PEERLESS.—On Wednesday last tunnel No. 1 was in 188 ft. The rock was very hard, with seams of quartz running through it. The outlook is very favorable. South drift from tunnel No. 2 is in 56 ft. Some very fine ore has been cut in this drift.

OLD DOMINION ITEMS.—Globe-Chronicle, June 7: The output of copper hulsion for the month ending last Sunday morning at 7 A. M. was more than anticipated, being very nearly 491 tons. This is by far the largest product from two 30-ton furnaces on record, and everyone connecting with the management has reason to feel proud of the month's work. To all who aided in this grand result, from the miner to the Supt., a great deal of praise is due and could be bestowed, but to none more, we think, than to Mr. John Canavan, the chief smelter, and his assistant, Mr. Barneyburg. Mr. Canavan's large run of 402 tons a year ago, and his present run of over 490 tons, is proof positive that what he does not know about smelting copper ores and running a 30-ton furnace isn't worth knowing.

COLORADO.

MINING NOTES.—Colorado Miner, June 5: In No. 5 on the Pay-Rock mine, Proutt & Co., in sinking a winze, have opened up a good streak of ore. A fourteen-ton carload of smelting ore from the Albro mine, at Dumont, was shipped to Denver this week. A good strike of copper-bearing ore is reported at the Big Chief mine. It is said that over two ft of the mineral carrying gray copper is uncovered. The Ilukill mine was sold by Deputy Marshal Cantrill last Monday for the sum of \$14,500. At the Little Giant lode on Red Elephant, owned by C. B. Koontz, is reported a very promising strike; it is claimed that a vein of solid ore, from two to three inches in thickness has been encountered, the character of which is silver glance, ruby silver and gray copper. Fifteen stamps are at work at the Mansfield mill on the free milling ore from the Albro mine, at Dumont. Five stamps at the same mill are at work on free milling ore from the Old Settler, which is running very high in gold. The Georgetown tunnel, owned and worked by Beebe & Co., at 200 ft. intersected an unknown cross lode this week. They have penetrated this crevice about four feet, and yet no foot wall has been encountered. The whole crevice, so far, is disseminated with small particles of mineral, galena and iron pyrites. A vein of quartz from five to six inches thick, shows bunches of mineral, of what might be determined solid, but yet not quite. The Choctaw lode, located on Saxon mountain, near Alvarado, is owned by John Tomay, Thomas Barnes and Dr. Cherry, of Baltimore, Md. The work now going on is drifting and stopping from crosscut. This crosscut is 72 ft in length, and intersects with the lode 70 ft perpendicular from the surface, the drift upon the vein has reached a distance of 250 ft. The work under way is in this part of the mine, and the showing, at this writing, is a vein three and one-half inches in thickness, of solid argentiferous galena, which mills 100 ounces silver to the ton. The Sonora lode, located on Griffith mountain, within sight of Georgetown, is owned by Joseph Guannella & Co. The adit on the vein is 350 ft long, at the breast of which is a perpendicular depth of 250 ft. The breast now shows a vein of solid ore about three inches in thickness, of a galena nature, carrying gray copper. The last millrun shows 110 ounces silver, half an ounce gold, and four per cent copper to the ton. A specimen assay showed 1.035 ounces silver.

IDAHO.

PLACER CENTRE.—Cœur d'Alene Pioneer: The new camp of Placer Centre is between the mouths of Canyon and Nine-Mile creeks at the scene of the late stampede to the South Fork of the Cœur d'Alene river. A great many stories pro and con have gone abroad regarding the results of the stampede, and while the placers have not satisfied the stampedeers, still the lode has resulted in the discovery of several valuable leads that are likely to bring that region into the foremost ranks of base-metal camps. Messrs. Dowd, Wallace and Norton of Fort Cœur d'Alene, own the townsite of Placer Centre, and the Mullen road runs through it. There are now about two dozen houses in the camp. Messrs. Norton and Wallace have made an effort to reach bedrock, but without success. They ran a drain ditch 20 ft and sank 15 ft more, but were finally compelled to quit work by the flood of water which ran in. They obtained colors, however, and will resume work as soon as the water subsides. After the excitement over the placers had subsided, several of the more persevering continued to prospect up the creeks. Good colors were obtained at the mouth of Grouse creek, a tributary of Nine-mile. It is said that the prospects here are not inferior to those on Pritchard, albeit the owners are preparing to open the ground by a system of drain-ditches which have been begun. Several fine leads of galena and carbonate ores were discovered later both on Nine-mile and Canyon creeks and a little development work gives every evidence that they are of great value. The ore is high grade and carries gold in considerable quantities. The formation is granite, limestone and slate with a preponderance of the latter. The granite cleaves the slate in twain, while the limestone formation is in contact below. One of the most important finds is the Tiger, on the east side of Canyon creek, eight miles from Placer Centre. The ledge is four ft in width, and recent assays show the ore to contain 112 ounces in silver, \$20 in gold, with 35 per cent lead. Six men are opening up the claim, and have a ledge with well-defined walls. The extension on the Tiger is owned by Messrs. Wheeler and McVicker, of the Pritchard stampedeers, and they have a vein as promising as the Tiger. Across the creek from the Tiger is the Norton claim. It is a ledge of galena and carbonate ore, from two to four ft in width. The owners are sinking a shaft which is in mineral all the way from 20 ft. The Wonder, located by P. M. Barker, K. Seelye, W. B. Hays and W. W. Doty, is on the divide between Nine-Mile

and Canyon creeks, and two and a half miles from Placer Centre. The ledge is narrow, but correspondingly rich. Specimens brought to Murray are pronounced to be the finest specimens of galena ever seen. A shaft is down about 10 ft in this claim and a tunnel is started for the vein.

THE OLD WASH.—Explorations during the past week show that the old river wash is far more extensive than at first supposed. Reports from Placer Centre show that it exists on the divide between Nine-Mile and Canyon creeks, tributaries of the south fork of the Cœur d'Alene river. It is found on the hills at Evolution and near the mouth of Beaver creek, and has a course from east to west. The wash runs parallel with the old river channel on Pritchard creek, but its character is different. It is a decomposed granite, covered with oxide of iron, interspersed with well-worn boulders. Its existence can be accounted for if we suppose the main channel to be the wash on the north hill-sides along Pritchard creek, and this deposit to be on the rim. It would be a big river, it is true, but the wash would need a chaplain river to deposit it.

BUTTE.—The town of Butte is one of the suburbs of Murray, being distant only 14 miles. It is located on Pritchard creek, between the mouths of two very rich side gulches—Butte and Reeder. Butte was started last spring. Some of the best ground in the country is in its immediate vicinity, and at least 1,000 men are prospecting and mining within a short distance of the town. On Reeder gulch there are mountains of gold quartz that will in the near future make Butte a great mill point, while the placers show prospects which are not a whit behind those elsewhere along the creek. Butte creek is the main fork of Pritchard, and is 10 miles long. It carries a large head of water during the entire season. On it good ledges of free-milling and base ores have been found, although the country is comparatively unprospected. Ophir and Tiger gulches come into Pritchard creek from the south at Butte, and on both of them paying prospects have been found. Butte is where the Belknap trail first strikes Pritchard creek, and the trail from the rising camp of Carbon, at the head of Beaver creek, will come down Ophir gulch. Prospecting is lively. Everybody is looking for quartz. Quite a number of strangers are in town, looking for locations to start business. In Bonanza gulch, a tributary of Butte, there is a breeze over several large nuggets that were picked up in the gravel close to bed-rock. The prospects on the main creek are looking better every day. The old wash-gravel is found very rich at Butte, as high as 4 oz. being taken from a single pan. A tunnel is in on it nearly 60 ft, and has pay all the way. Old miners pronounce it the biggest thing yet found. Work on the Sargent claim will be begun this week. The claim is ready for the sluices, and with a decline in the water, active work will be begun and continued all summer.

MONTANA.

PHILLIPSBURG MINES.—Cor. Butte Miner, June 7: Mining matters remain about as usual; in fact, nothing very interesting can be written about such of our mines as may be undergoing development for the reason that, save and except the properties of the Hope company, nothing in the shape of ore can be treated in the camp. The Hope mill, which, now completely equipped, is running steadily, has sufficient company ore on hand to run six months, and will, of course, do no custom work. And as the statu quo of the Algonquin remains serene and undisturbed, it is highly probable that the mineral dumps or the district will have to be moved to Anaconda for treatment. With this flattering outlook for the present, we contentedly await the future.

SAN FRANCISCO.—A visit to this mine shows it to be steadily improving as the tunnel header gains depth. Three feet of ore stands in the level, much of it high grade and all of it fair. The strong similarity between the rock of this mine and that of the famous Granite mountain leads many to believe that it will eventually develop as well. It is beyond any doubt the next best property in the granite country of the camp. James Patten left for Salt Lake city during the week past.

WENGER NO. 2.—McDonald have about 75 tons of excellent rock on the dump. Work has been temporarily stayed in the mine, the owners seeing no opportunity to sell the ore now out. Four ft of 50 ounce rock lays in the face of the west crosscut from the 40 ft station. Five ton of 100 ounce ore can be easily extracted from this mine daily by stopping. Should occasion offer, the owners intend to ship to Anaconda the best of the rock they have assorted as the mine.

UTAH.

STRIKE IN THE NABOB.—Southern Utah Miner: The Beaver Lake boys feel quite jubilant over a strike lately made in the Nabob mine. Several days ago a streak of green rock was encountered in the ledge matter in the north drift, what was looked upon as poor or worthless ore, and part of it was thrown into a pile of second class ore, and part was thrown over the dump. Last week a sample of this ore was assayed with a result showing 864 ounces of silver per ton. It was almost an accident that the ore was ever sent to the assayer, and the result was a happy surprise to the owners. The ore is chloride of silver with quartz gangue. It runs for a distance of 25 ft through the ledge matter to the face of the drift, and varies in width from 4 to 6 inches. The ore body has now opened up to a width of 2½ ft, running diagonally across the drift. The ore is galena, carrying black metal and chloride of silver, and the green stained rock mentioned. The face of the drift has become soft, with seams of iron and spar running through it in all directions. The ore body has been widening out for the distance of 30 ft, and the indications are that before another 30 ft is run, the drift will be entirely in ore. There are about twelve tons of first-class, and between eight and ten tons of second-class ore on the dump. The owners will make a shipment to Salt Lake this week. Two men can easily take out between 1,200 pounds and a ton of ore daily, which will assay from 100 to 2,000 ounces of silver to the ton. This property has been abandoned for several years, the only work that was done was by chloriders, who gouged the ore out wherever they could find it, leaving hardly a trace in sight, last winter when R. S. Lipscomb took hold of the mine.

For Shareholders' Directory, etc., see following pages.

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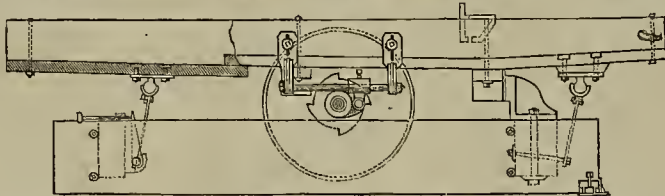
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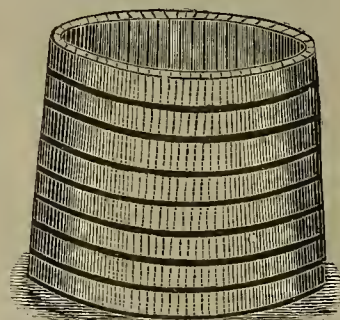
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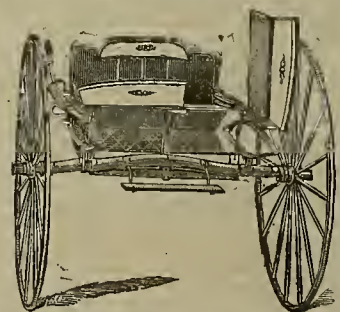
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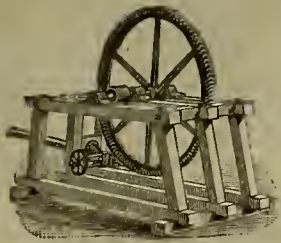
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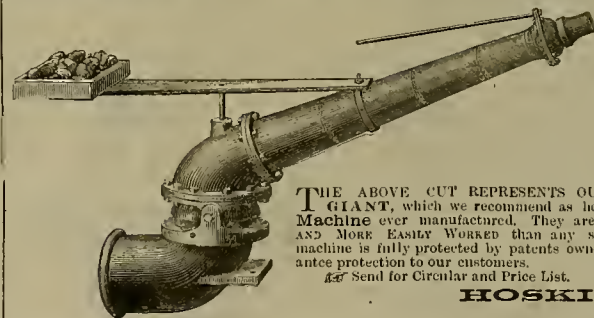
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Two metal strips have pivoted to their lower ends a curved metal strip. At the top of the upper strip is a strap. The metal strips are curved to fit the body. To one of the strips at about the center is secured a strap the other end of which is adapted to be secured to the other strip, preferably by buttons and button holes. These button holes are placed at different distances upon the strap to adjust its circumference. On the center of the strap is a pad suitably covered, and the metal parts are also covered properly.

The curved strips are fitted upon the abdomen, the base strip at the bottom and the top strip above. The curves of the strip conform nicely to the part fitted. As before said, the base strips are pivoted to the base strap. This is for the purpose of allowing the adjustment of the strips with regard to their side inclination. By having a longer or shorter strap, or a strap rendered extensible in any manner, the metal strips may be drawn closer together or allowed to spread at their tops to suit the comfort of the wearer.

The strap passes around the waist, and is drawn sufficiently tight and secured on the other end, thus forming a supporting belt for the device. The stiff pad on the belt fits upon and presses into the small of the back. It keeps the back straight. There is no inclination to bend at this point, because the small of the back is sufficiently sensitive to cause the wearer to avoid unnecessary bending. The front portion upon the abdomen assists the pad. When the small of the back is thus kept straight there is no chance to give at this portion, and, as in throwing the shoulders forward, this portion bends also; when this is prevented the inclination is to keep the shoulders straight. If the lower part of the body be kept straight it is inconvenient to do otherwise than to keep the whole body in like position, and therefore the shoulders are thrown back. The device is a good support for the body, and after being worn a short time becomes comfortable. It does not interfere with other portions of the body.

We can confidently recommend those needing a supporting apparatus to try this new device, or consult Dr. Anderson as above for further information.

Mining Share Market.

The mining stock market maintains its wonted quietude, transactions being very insignificant and variations in price small. No news of any special importance comes from Bodie. On the Comstock, at the north end, the Mexican mine has just reached the 3,200 level—the greatest depth ever attained in North or South America. The material at that point is a soft mixture of clay and quartz. So soft is the ground that a station will not be opened in it.

At the middle mines all is going on about as usual. The Hale and Norcross folks are shipping from the bonanza on the 200 level eight car-loads of ore a day to the Mexican mill, Carson river. There is no mining doing on the 2800 level. The Savage bulkhead is finished, but there is now talk that prospecting will not be resumed below until the Cornish pump is in operation at the 2900 station of the Combination shaft; meantime the stock of the middle mines will be beaten down to the lowest possible notch.

At Gold Hill the leading mines are taking out and shipping the usual amount of low-grade ore from the upper levels.

Bullion Shipments.

Alhambra, June 7th, \$13,700; Cuba No. 1, 7, \$9,634; Manhattan, 5, \$21,755; Hanauer, 3, \$4,145; Stormont, 3, \$3,260; Horn Silver, 3, \$21,000; Ontario, 3, \$11,142; Horn Silver, 4, \$6,000; Hanauer, 5, \$2,050; Ontario, 5, \$1,550; Horn Silver, 5, \$12,000; Ontario, 7, \$4,108; Horn Silver, 7, \$6,000; Hanauer, 8, \$2,250; Horn Silver, 8, \$6,000; Ontario, 8, \$5,921; Ohio, 9, \$8,000; Bonanza King, 8, \$6,131; Bodie, 9, \$23; Syndicate, 2, \$6,657.

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Belmont M Co.	Nevada.	37.	15.	May 26.	June 30.	July 28.	J W Pew.	310 Pine st
Bullion M Co.	Nevada.	29.	25.	May 19.	June 20.	July 10.	J M Brazell.	328 Montgomery st
Butte Creek Hyd. M Co.	California.	9.	10.	May 13.	July 10.	July 30.	B L Taylor.	330 Montgomery st
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Tilden M Co.	Nevada.	3.	05.	Apr 15.	May 19.	June 19.	C V Hubbard.	310 Pine st
Union Cou M Co.	Nevada.	27.	50.	June 2.	July 14.	July 31.	J M Buffington.	309 California st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bodie Con M Co.	California.	G W Sessions.	309 Montgomery st.	Annual.	June 16
North Belle Isle M Co.	California.	T J Watson.	114 Davis st.	Annual.	June 19
Vanderbilt M Co.	California.	J W Pew.	310 Pine st.	Annual.	June 25
		J Morizio.	328 Montgomery st.	Annual.	June 19

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D C Bates.	309 Montgomery st.	25.	May 15
Bodie Con M Co.	California.	G W Sessions.	309 Montgomery st.	50.	June 5
Derbec Blue Gravel M Co.	California.	T Wetzel.	522 Montgomery st.	10.	May 27
Idaho M Co.	California.			4.00.	Apr 2
Jackson M Co.	California.	D C Bates.	309 Montgomery st.	10.	Mar 16
Paradise Valley M Co.	Nevada.	W Letts Oliver.	328 Montgomery st.	10.	Jan 19
Standard Con M Co.	California.	Wm Willis.	309 Montgomery st.	25.	Mar 28
Syndicate M Co.	California.	J Stadfeldt.	419 California st.	10.	Apr 5

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 22.	WEEK ENDING May 29.	WEEK ENDING June 5.	WEEK ENDING June 12.
Alpha.	1.25 1.05	1.10	1.05	1.15
Alto.	2.20 2.01	2.00	1.75	2.00
Andes.	1.10	.35	.35	.40
Argenta.				.30
Belcher.	1.00	1.00	1.00	1.00
Belmont.	1.70	2.60 1.75	2.01	1.80
Bullion.				.10
Bonanza King.	.40	.65	.50	.55
Bodie Con.	2.85	3.35 3.00	4.15	3.80
Bodie Tunnel.				.50
Bodie Tunnel.	.45	.50	.55	.60
Bulwer.	.10	.25	.15	.10
California.				.15
Challenge.				.20
Chollar.	1.15	1.45 1.10	1.75 1.35	1.65 1.30
Confidence.			1.20	1.00
Con. Imperial.	.20	.25	.15	.20
Con. Pacific.			.25	.20
Crown Point.	1.20	1.40 1.25	1.40 1.20	1.30 1.05
Day.	2.35	2.45 1.90	2.06 1.75	1.90
Eureka Con.	3.20	4.00 2.25	2.80 2.55	2.60
Exchequer.		.05	.10	.25
Grand Prize.		.15	.05	.10
Gould & Curry.	1.35	1.60 1.20	1.40 1.05	1.25
Goldsway.		.10		.15
Hale & Norcross.	2.05	2.70 2.45	2.91 1.80	2.20 1.50
Holmes.		.30	.20	.30
Independence.		.30	.20	.30
Julia.	.25	.30	.20	.25
Justice.		.55	.80	.75
Mammoth.		.55	.80	.75
Mexican.	1.60	1.55 1.40	1.80 1.35	1.60 1.00
Mt. Diablo.		2.35 2.10	2.25	2.30
Northern Belle.		3.25 3.00	3.20 3.15	3.10
Nevada.		.20	.25	.20
North Belle Isle.		.20	.25	.15
Occidental.		1.00	1.00	1.00
Ophir.	1.20	1.55	.80	1.20
Orman.		.25	.20	.20
Potosi.	.60	.75	.40	.35
Pinal Con.		.65	.70	.65
Savage.	.65	1.00	.70	.80
Sog. Belcher.				.35
Sierra Nevada.	1.20	1.60 1.00	1.80	1.50
Silver Hill.				.50
Silver King.		5.25 5.25	5.50	5.50
Scorpion.	.30	.35	.25	.20
Syndicate.	.35	.40	.45	.45
Tilden.	1.85	2.10 1.55	2.10 1.40	1.65
Union Cou.	1.10	.30	.65	.85
Uta.		2.15	1.80	2.05
Yellow Jacket.	2.00	2.15 1.80	2.05 1.75	1.80 1.60

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

CRISTY M. Co., June 9th. Capital stock, \$1,000,000. Directors, Robert N. Graves, O. F. Giffin, F. A. Benjamin and W. M. Lubbock.

SONORA ANTHRACITE, COAL AND DEVELOPMENT Co., June 9th. Capital stock, \$10,000,000. Trustees, Daniel E. Hayes, P. T. Dickinson, Nathan W. Spaulding, P. McAnan and Alexander G. Hawes.

CALIFORNIA OIL Co., June 10th. Capital stock, \$1,000,000. Directors, C. C. Lane, F. Hoelling, Isaac Birbaum, A. W. Fox and N. D. Anderson.

GAVER IMPROVEMENT Co., June 10th. Object, a general mining and milling business. Capital stock, \$25,000. Directors, John Wright Jonas Call, John R. Supham, Gibson P. Kelly and C. M. Tyler.

MAGINNIS M. Co., June 5th. Principal place of business, Helena, M. T. Capital stock, \$500,000. Directors, Samuel T. Hanter, Anton M. Holter, Geo. H. Hill, Ashburn K. Barbour and Alfred M. Esler.

COMMERCIAL M. & M. Co., June 2d. Location, Centennial district, Elko Co., Nevada. Capital stock, \$250,000. Directors, Geo. W. Pelier, A. V. Lancaster, E. L. McMahan, J. W. Powell and A. V. Price.

The Russian government has borrowed \$200,000,000.

Photo-Engraving, Etc.

Some of the finest and most accurate engravings in the United States are now executed by photo-relief processes at greatly reduced rates from the prices of good wood engraving.

We are prepared to receive orders for all kinds of engravings, to be executed by photo-relief electrotype process, or wood engraving, as the style, quality and price to be paid may indicate.

We will guarantee satisfaction as to quality of work and prices.

Drawings will be made from photographs, models, paintings, sketches, etc.

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Send particulars and samples of engravings wanted and ask for prices.

When requested, our city agent will call to receive orders and explanation.

Engraving by the aid of photography is comparatively new; the work is progressive; better facilities are being constantly acquired, the results improved, and the prices lowered for good and satisfactory work.

ADDRESS THIS OFFICE.

A RARE CHANCE.

A party with \$20,000 to purchase a third interest in a mine that has in it many a vein. On one there is a shaft 38 feet deep, in 4 feet of Silver King ore, assaying \$400 per ton. At the center there is a dike or lift in the belt of veins full 50 feet in width, that runs across the mine. Twelve feet from the center of this lift there is a shaft 23 feet deep, the bottom all in tale and white porphyry, streaked with veins of quartz specked with ore. This mine is 1½ miles northwesterly from the Silver King mine, in an overlooked section of country, but is in the same formation that the Silver King is in. Half of the purchase money will be used in opening and developing the mine. The party accepting this offer will draw a prize equalled by none—yes, not even by the famous Silver King—for through it surely flows the Equator of the Silver Zone. For further information, address

SAM. THORPE,
Silver King, Arizona.

San Francisco Metal Market.

WHOLESALE.		THURSDAY, June 17, 1884.	
ANTIMONY—Per pound.	14 @	15	
IRON—Per Pound (extra).	254 @	00	
IRON—Chengarnockton.	254 @	00	
Eglinton, ton.	250 @	00	
American Soft, ton.	250 @	00	
Oregon Pig, ton.	32 @	35	00
Clippers, Cap. Nos. 1 to 4.	32 @	35	00
Renewed Bar.	31 @	00	
Horsehoes, keg.	5 @	50	00
Nail Rod.	71 @	00	
Norway, according to thickness.	61 @	71	
Steel—English Cast, B.	15 @	16	
Black Diamond, ordinary.	14 @	00	
Drill.	12 @	14	
Machinery.	22 @	00	
Copper—Ingot.	28 @	00	
Brass—sized.	25 @	27	
Fire-box sheets.	25 @	00	
Bolt.	25 @	00	
Old.	8 @	00	
Bar.	12 @	00	
Copper, 100 lb.	44 @	00	
LEAD—Pig.	4 @	00	
Bar.	7 @	00	
Pipe.	8 @	00	
Sheet.	8 @	00	
Terne.	2 @	00	
Shot, discount 10% on 500 bags; Drop, 2 @	2 @	00	
Back, 2 @	2 @	00	
Chilled, do.	2 @	00	
TIN PLATES—Charcoal.	7 @	00	7 25
Coke.	6 @	00	6 75
Terne.	6 @	00	6 75
L. C. Charcoal R ordinary 14x20	6 @	25	6 50
ZINC—By the cas f.	19 @	00	
Sheet, 7x3 ft, 7 to 10 lb, less the cas.	9 @	10	
NAILS—Assorted sizes.	3 @	25	00
QUICKSILVER—By the flask.	2 @	00	
Flasks, new.	1 @	05	00
Flasks, old.	85 @	00	

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

J. MACDONOUGH.

J. C. WILSON.

J. MACDONOUGH & CO.,

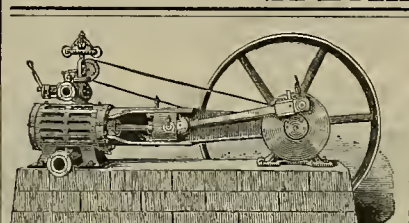
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Heavy Automatic and Slide-valve Engines,

STATIONARY and PORTABLE BOILERS,

And Heavy Saw-mill Machinery.

SOLE AGENTS FOR THE...

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS, PATENT AGENCY, 252 MARKET ST., S. F.]

FOR WEEK ENDING JUNE 3, 1884.

- 299,504.—PORTABLE DERRICK—AUSTIN & SCO-ville, Oakland, Cal.
 299,505.—STEAM BOILER—E. B. Badlam, S. F.
 299,512.—JUG OR PITCHER COVER—W. C. Bodetel, S. F.
 299,506.—VEHICLE WHEEL—J. J. Bush, Tacoma, W. T.
 299,747.—DOOR SECURER, ETC.—E. P. Conner, Santa Rosa, Cal.
 299,772.—ROTARY ORE PULVERIZER—J. B. Gagnon, Oakland.
 299,775.—HARNESSE BUCKLE—J. A. Gavit, Walla Walla, W. T.
 299,924.—SKATING RINK FLOOR—G. C. Harkins, Salt Lake City, U. T.
 299,553.—DUPLICATING ENGINE—M. B. Kellogg, S. F.
 299,798.—WHEELBARROW AND SLED—F. B. Kendall, Tunawater, W. T.
 299,554.—BUILDING AND SETTING MOLDING CAISSONS—P. A. Kewley, S. F.
 299,556.—ELEVATOR—Lesourd & Lotan, Portland, Or.
 299,668.—PEN HOLDER AND BLOTTER—J. F. Miller, Oakland, Cal.
 299,699.—HANDLE FOR CROSSCUT SAWS—A. Uren, Seattle, W. T.
 299,882.—CONNECTING AND SUPPORTING SECTIONS OF DREDGER DISCHARGE PIPES—A. W. Von Schmidt, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

LAYING AND SECURING RAILS.—Jeanty Denechaud, Sr., S. F. No. 299,208. Dated May 27, 1884. This improvement in laying and securing rails in the road beds of railways consists in imbedding in the cross-ties the base and lateral flanges of a peculiar rail and in securing it by a novel brace or clamp, the base of which is also let into the cross-tie. The object is to prevent spreading of rails by securing them to the cross-ties so firmly as to give solidity. The invention is applicable to any railway, but is more specially for use with a safety railway car patented by the same inventor, and in which rollers secured by arms to the car are adapted to be projected into the groove of the rails to prevent derailment.

LAP BOARD.—Adam L. Anthony, Placerville. El Dorado Co., Cal. No. 296,219. Dated April 22, 1884. The improvement consists in sliding slides or leaves and in hinged corners, whereby the lap board may be closed up to smaller dimensions, either for convenience in use or transportation. The object is to provide an extensible lap board which may be adjusted to different sizes and closed up for transportation.

Secure the Reduced Rate.

After the first of April, 1884, we announced a reduction of the price of the MINING AND SCIENTIFIC PRESS from \$4 to \$3 a year to all who would settle up arrearages at old rates and pay in advance thereafter. There are some who have not yet taken advantage of this offer, and we would therefore urge all subscribers still in arrears to remit what is due us to this date, at the rate of \$4 a year, and pay in advance for another term at the reduced rates for new subscriptions paid in advance.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.
 JARED C. HOAG—California.
 J. J. BARTLE—Sacramento county.
 A. S. DENNIS—San Mateo county.
 A. C. KNOX—Sonoma, Lake and Mendocino counties.
 C. D. McDUFFY—Sacramento county.
 JOHN H. STURCKE—Santa Clara county.
 B. W. CROWELL—Fresno and Tulare counties.
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PRICES GREATLY REDUCED.

IRON CLAD MANUFACTURING CO.

22 Cliff Street, New York.

A Plain Book on Assaying.

"ASSAYING GOLD AND SILVER ORES"—By C. H. Aaron—Is a new work published by Dewey & Co., which is intended by its author to be available for the use of miners, prospectors and others who only care to know how to assay gold and silver ores.

The author of this work is well known in the mining regions of the Pacific coast as a practical metallurgist of many years experience. His writings for the press and his two previous works ("Testing and Working Silver Ores," and "Leaching Gold and Silver Ores") have shown his ability as a writer. The little book is plainly and simply written, more especially for the use of those persons not familiar with chemistry. No symbols are used, everything being plainly stated and clearly described. The scope of the book is shown in its table of contents as follows: Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables. These assaying tables give simple directions for figuring out results. This is the simplest, cheapest and most easily comprehended work on assaying yet published. The volume comprises 106 pages, with illustrations, and is well bound in cloth. The price is \$1, postpaid. Published by Dewey & Co., MINING AND SCIENTIFIC PRESS office, San Francisco—1884.

Mining and Scientific Press.

THE MINING AND SCIENTIFIC PRESS is the leading mining journal in America, and enjoys a larger circulation among the more intelligent operators and workers in the gold fields of the world.

Established in 1860, it has firmly maintained its position as a reliable, progressive journal. The information given in its columns has saved millions of dollars to the practical miners, metallurgists, mill men, mine and share holders on the Western side of our continent.

Among its contributors are the ablest and most experienced mining engineers, superintendents and practical miners in this country.

The Press gives a condensed summary of Mining News from the most important mining districts of the country. New processes and methods of mining are described in its weekly issues. New mining machinery and improvements are frequently illustrated and explained in a manner to be of great value to all interested in mining.

As a scientific and mechanical representative of the Pacific Coast it is decidedly popular, and a standard journal with the most thrifty industrial people of the Pacific States and Territories. Its authority is of the highest order, and its usefulness in its special sphere unrivalled.

Every public library, mining engineer, metallurgist, mining operator, and intelligent mechanic and manufacturer, will find profit by its reading.

Subscription, \$3 a year in advance. Sample copies, prepaid, 10 cents.

DEWEY & CO., Publishers.

No. 252 Market St., San Francisco, Cal.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Company.

ASSESSMENT No. 48.

Levied..... June 6, 1884.
 Delinquent..... July 11, 1884.
 Day of sale..... August 4, 1884.
 Amount..... Fifty cents per share.

ALFRED K. DUBROW, Secretary.

OFFICE—Room No. 69, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

Cheap Ore Pulverizer.

There is for sale in this city, by L. A. Heald, American Machine and Model Works, 111 and 113 First street, a Rutherford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. References as to above can be had upon applying to this office.

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STEAM PUMP for Lifts from 10 to 70 ft.
 FOR IRRIGATING PURPOSES

And all General Work where a Simple Durable Pump is Required.

NO VALVES! NO PISTON!
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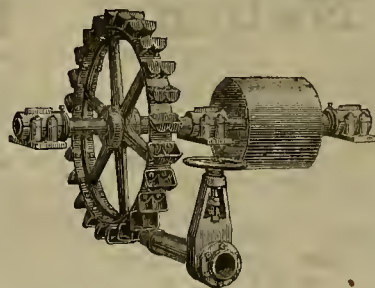
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Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

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Extra sizes and lengths made to order on short notice.

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PATENTS obtained promptly; Caveats expedited; Patent Reissues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Infringements Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

Foreign Patents.

In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Pomerania, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Ruman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and thoroughly established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of most inventions discovered here than any other agents.

Situated so remote from the seat of Government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars of information to inventors, free.

Home Counsel.

Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes mis-carry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

Engravings.

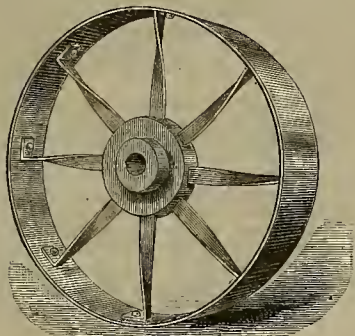
We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

DEWEY & CO.,

United States and Foreign Patent Agents, publishers Mining and Scientific Press and Pacific Rural Press, 252 Market Street Elevator, 12 Front St., S. F.

Iron and Machine Works.

MACBETH'S
—PATENT—
STEEL PULLEY.



Advantages of these Pulleys.

They are less than half the weight of cast-iron pulleys; are polished on the face; are made either crowned or straight, and are turned in the lathe the same as the best make of cast-iron pulleys. They are carefully balanced. They are subject to no contraction strains, and can be run at very high speed without danger of bursting. On account of their great lightness and the form of the arms, they absorb less power than any other pulley. They are the only pulley of the kind which runs true. They cannot be broken in transport.

TESTIMONIAL:

MATHER LANE SPINNING CO. (Limited),
LEIGH, ENGLAND, Nov. 5, 1883.

N. Macbeth, Esq.—Dear Sir: The Patent Steel Pulleys supplied throughout to our No. 2 Mill are working to our entire satisfaction.

They are very true, and are about 50 per cent lighter than the cast-iron pulleys in our No. 1 mill.

Yours faithfully,
For the Mather Lane Spinning Co. (Limited),
[Signed:] RICHARD T. MARSH,
Managing Director.

Risdon Iron & Locomotive Works,

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California Brass Foundry,

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All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

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TESTIMONIALS.

ST. LOUIS, Mo., Sept. 28, 1883.

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ANHEUSER-BUSCH BREWING ASSN.

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BERLIN, Sept. 23, 1883.

To Mr. H. Heine, Civil Engineer: In reply to your inquiry of September 2d, we respectfully inform you that the three boilers built under your patents, under steam since September 25, 1881, at the Alexander Place Depot, as well as the two at Friedrich Strasse Depot, under steam since September 22, 1882, have given good satisfaction, requiring no repairs whatsoever to date. The internal cleaning of the boiler was always accomplished

with ease on account of the convenient arrangement of the title caps, the adhesion of scales being fully prevented thereby, and the boilers kept in prime condition. (Signed): BRAUCKE.

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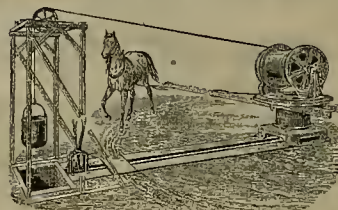
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THE MOST EFFICIENT AND PRACTICAL MACHINE ever invented for the service of Prospectors and others requiring the use of a Horse Power; possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower without interfering with a hoisting apparatus.

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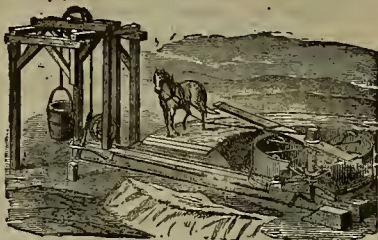
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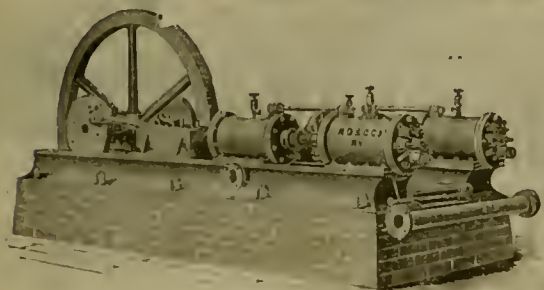
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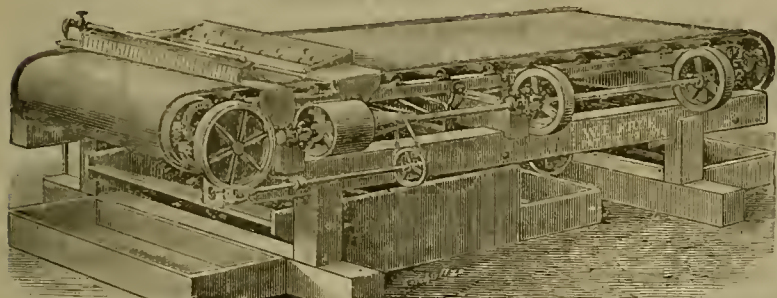
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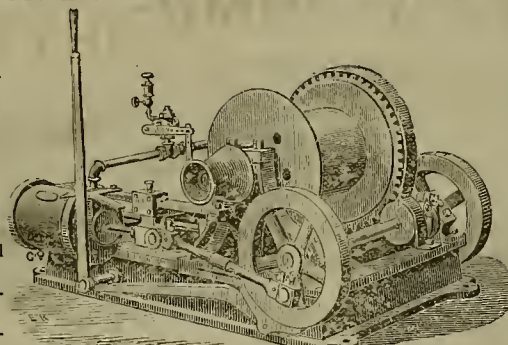
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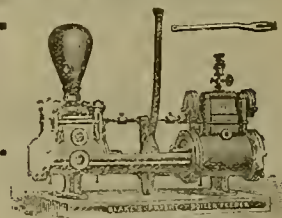
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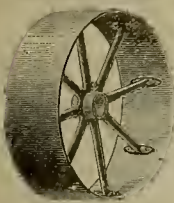
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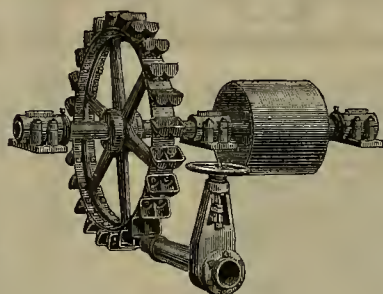
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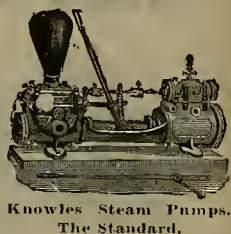
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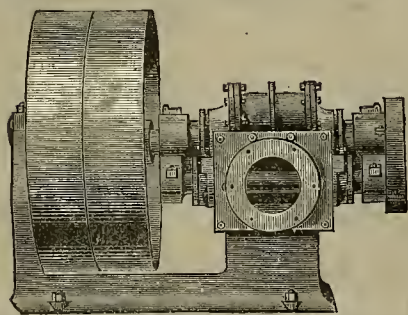
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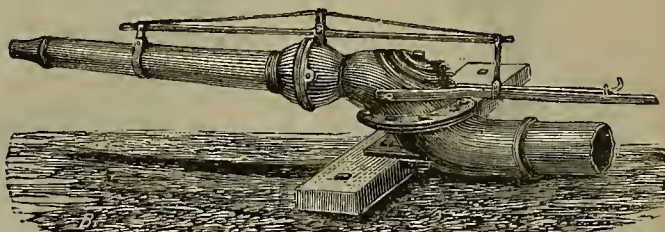
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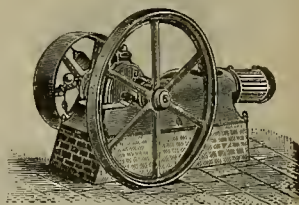
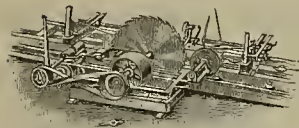
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JUNE 21, 1884.

VOLUME XLVIII
Number 25.

Hand-boring Drills.

There are several forms of hand-boring drills which are now successfully used in anthracite boring, all of which are improvements on the old slate auger or shale auger, varying in details of construction. The inventions are in the method of lengthening, feeding, adjusting the crank, fastening the drill in the coal, shape of edges, etc. With any of them the miners must first hew a hole three or four inches in diameter in the face, or two or four inches high by five or eight wide, and six inches to a foot deep. The clamping bar is fastened by wedging or clamping in this hole. These boring tools have not reduced the cost of mining when performed with jumpers or ordinary drills. But it does not follow that advantages have not been derived from the use of them. It is the miners themselves who have used these machines who have received nearly all the benefits. The miners can do more work. A miner doing more work requiring certain skill will not receive more than a certain sum per day for that work, without regard to the increased amount of work improved machinery may enable them to perform, so the benefits of the system will eventually accrue to the mine operators. The miner who buys and uses these machines is benefited either by receiving pay on a larger number of ears, by finishing his work earlier, or by not working so hard as those men using the ordinary drill. Dr. Henry M. Chance, assistant geologist of the geological survey of Pennsylvania, who has had abundant opportunities for observation, states that some miners cannot learn to use these boring machines; they can neither set them properly, hold them in position until the hole is finished nor bore as quickly as with the ordinary hand drill. Others will not use them because they dislike to turn a crank, preferring a "jumper." To obtain the best results from these machines, or even to make as good time as with the ordinary drill, they must be placed in the hands of apt, intelligent and experienced miners. In the hands of a dull, slow thinker less work will be accomplished than with an ordinary drill, but a good workman can often drill his holes with the machine in half the time occupied in drilling by hand. These are some of the causes why boring drills have not more quickly replaced hand drills. These drills are commonly the private property of the miner, and before he can be induced to buy one he must be convinced not only that it will be to his advantage to own it, but he must be persuaded to abandon the spirit of conservatism common to his class.

DURING the first five months of the present year 910 miles of railroad track have been laid in the United States. During the same period fifteen roads have been placed in the hands of receivers.

Centre Crank Portable Engines and Boilers.

We present this week an illustration of a simple and serviceable form of a centre crank portable engine and boiler on skids, denominated very aptly the "New Economizer," constructed by the Porter Manufacturing Company, of Syracuse, New York.

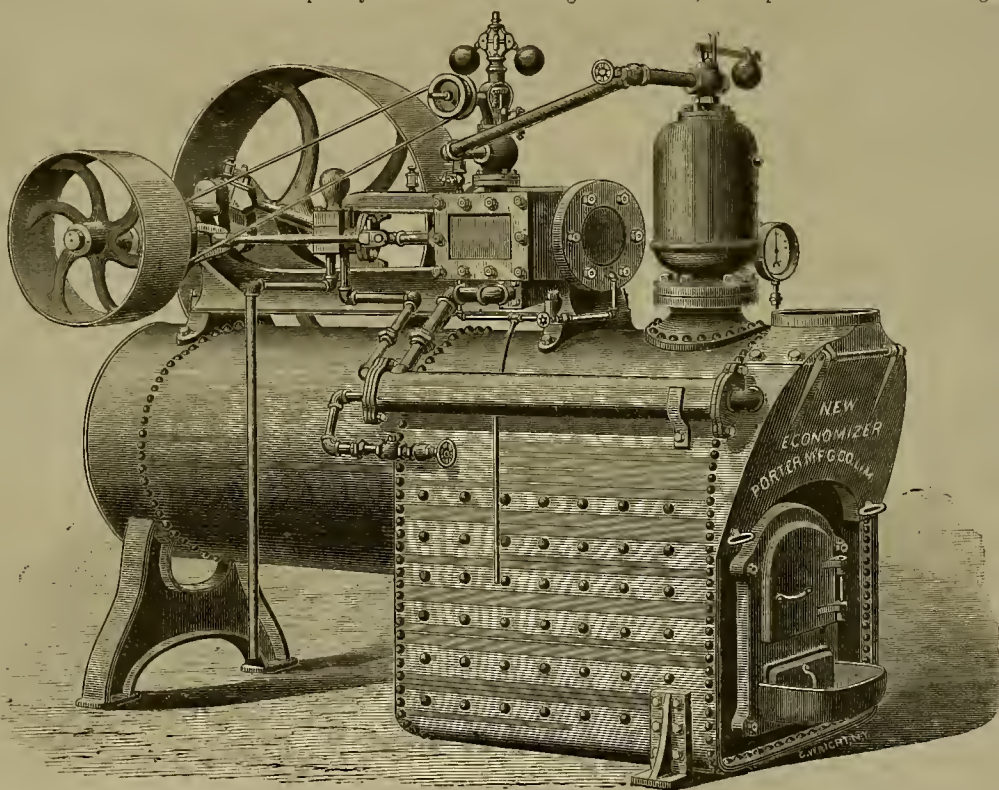
The boilers are built especially with a view

of ensuring the consumption of a minimum

of fuel, which is accomplished by the construction of a large fire flue extending under the tubes from the rear of the fire-box to the end of the boiler, which virtually serves as an enlargement of the fire-box and consequently the heat spaces. The flames from the fire-box pass into this accessory flue, in an entire body, and in its passage the gases become thoroughly ignited before entering into the small return. The fire is entirely surrounded by water, and the front itself is so arranged as to act as a heating surface; and there being no obstruction to the draft, evaporation is necessarily very rapid. The combustion chamber is surrounded by a water jacket which protects the shell from the intense heat to which it is subjected when straw or other light fuel is used. This also gives an additional heating surface which accelerates the generation of steam. The return of the flames through the small tubes compels the deposit of nearly all of the sparks in the rear chamber, and, therefore, comparatively few are emitted from the stack. The crown sheet is guarded by the rows of tubes over it, and in the event that water should, by carelessness, become low, the tubes being first uncovered are first liable to give way before the water is so low as to leave the crown sheets unprotected. These improvements insure one of the safest forms of boilers, and the danger of fire from the

emission of sparks is almost entirely obviated.

The engines are built either with center or side cranks; they are perfectly balanced, and vibration even at the maximum of labor is reduced to a minimum. They can be run to a very high speed and are so mounted that they can be detached from the top of the boilers and placed on separate foundations and used as stationaries, and as such can be operated as either right or left hand, as the power can be



NEW ECONOMIZER, PORTABLE ENGINE AND BOILER.

transmitted from either side. The boilers and engines are thoroughly tested before leaving the works of their builders to full standard pressures and powers. They are mounted either on skids or wheels as the conditions of use may require. Mounted on skids these "new economizers" are built of a capacity of from three to twenty horse-power and will be found serviceable for pumping water, sawing wood, farm and dairy uses, running small machine shops, sewing machines and for many other purposes where small powers may be useful and required. Mounted on wheels they form agricultural engines complete for threshing and have been found very successful as straw-burners, and with a simple change of grates are equally well adapted for burning wood or coal. Larger sizes either mounted on skids or wheels are built especially for operating saw-mills, where the necessity or desirability arises of transporting portable engines and the accompanying saw-mills to the vicinage of the timber to be cut. In such events of use green wood and slabs are ordinarily the only available fuel and, therefore, the surplusage of boiler capacity and heating surface in the form herein illustrated becomes desirable from an economic point of view. Several sizes of these engines, just received by rail from their manufacturers can be seen, completely set up, at the "Joshua Hendy Machine Works," the agents in this city.

in any direction the line of least resistance leads it. Mr. MacGeorge had drawings of several mining operations in Australia in which the clinograph had accurately directed underground operations where search was being made for auriferous rock discovered by the drill. Expensive operations had been conducted on the supposition that this drill had followed a straight line, but the ore indicated was not found. The failure of one very important operation in which Mr. MacGeorge was interested prompted experiments, which resulted in the invention of the clinograph.

A long drill cannot be made to bore straight, and that is not to be wondered at considering that for a length of perhaps 500 feet the drill-rod has only a diameter of one inch and a half. It is no uncommon thing for the bore to vary ten feet laterally for every 200 perpendicular feet drilled. This in 500 feet would amount to 25 feet variation, and when the miners came to run drifts to tap the desired lode that 25 feet would cause them endless trouble and expense, for they would have to drift around in a speculative way to find their objective point. Sometimes it will go 75 feet out of the way.

The Australian Government, which has charge of nearly all the diamond drills in that country, has adopted the clinograph in its operations.

The clinograph is a new instrument for miners' use, for determining the extent and direction of deviations in long diamond drill borings. Mr. E. F. MacGeorge, of Melbourne, now in this city, has one of these instruments on exhibition at the State Mining Bureau. The instrument consists of a glass tube, about eight inches long and one inch in diameter, having at each end a glass bulb, joined by a small glass tube running through the outside inch tube. In one bulb is a delicately adjusted magnetic needle, and in the other a plummet. Both of these are freely suspended, when the whole instrument is filled with a hot solution of gelatine, in which the plummet and needle adjust themselves accurately. The instrument is then enclosed in a brass sheath and inserted any distance desired in the drill hole to be surveyed. The gelatine, cooling, hardens and fixes the needle and plummet in positions exactly indicating the direction and deviation of the bore. The instrument is then withdrawn and placed in another instrument, also the invention of Mr. MacGeorge, which marks in degrees and minutes the deviation from the perpendicular or horizontal, as the drill may have been run, and the direction of the deviation, as indicated by the needle and plummet in the solidified gelatine. The usefulness of this instrument is that in long drillings of several hundred feet the sectionalized drill very seldom follows a direct course, the fastening of the sections giving it independent motion to swerve

The Clinograph.

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The New Metropolis at Coeur d'Alene.

From the Coeur d'Alene Pioneer which was lately moved from Eagle to Murray, we take the following notes of the new metropolis:

It can now well be said that Murray is the Coeur d'Alenes, for the marvelous growth of this young town has placed it beyond controversy, in the position of the metropolis of the Coeur d'Alene country. The town was laid out on the 22d day of January, and officially surveyed on the 7th of the following month. The birth of the new town attracted hardly a notice in the independent city below, and it was not to be wondered that bare whisperings of a new town was heard in March along the railway.

In the meanwhile the town grew apace. The locators had bought experience with fortune and were going to be right this time. The gold was here, and they were not long in learning that the flat where Murray now stands was in the centre of all the pay-ground that was known on the creek. The forks of two creeks was no argument against the heart of the mines. So on three contiguous claims—the Murray, Ives and Widow—on a flat about a quarter of a mile wide and a mile long, the town of Murray was laid out.

Summit District.

On the 7th of February the new Summit mining district was formed and W. H. Clagett elected recorder. The records were transferred to the new town, and at a miners' meeting a separate code of laws for the government of the district was adopted, which at once set the claims on a paying basis and compelled a fair division of the ground.

Late Events.

While the rival town of Eagle had what little capital had come into the country, and had three newspapers to shout for it, Murray gradually grew until the resources about it, which had hitherto been the life of Eagle, began to concentrate at the most convenient point. With all the boom that printers' ink can give, Eagle city could not live without the product of the country about Murray, and its decline at the rise of this town was not to be wondered at by men who have figured mining camps down to a system.

From one house in January it has grown to be larger than all the towns in the Coeur d'Alenes combined, and we can say without fear of contradiction that nine-tenths of the business of the country to-day is carried on in Murray. No place ever became so warm a favorite in so short a time, and it is with pride that Murray can thank the friends who so kindly rocked its infant cradle.

The Mines.

Murray, as we have said, is in the very center of the producing mines on Pritchard creek. In fact the town itself is on three famous claims—the Widow, Murray and Ives claims. Alder gulch, which is producing over an ounce to the man every day, comes into the town and forms one of the cross-streets.

Below the town, within three-fourths of a mile, rich gulches come in from the north—Nugget, Buckskin, Missoula and Dream. On all these pay has been found and work is actively progressing. Accounts of the wealth of these gulches have appeared in the Pioneer. Above town is Gold Run gulch, which is fully as rich as its famous namesake in California, and above this is Wasp gulch, known to contain rich ground. Then comes Cougar, Rockford and Reeder gulches, all from the north. On the last are the great

Quartz Leads.

Which are destined to be the mainstay of the camp long after placer mining shall have ceased. Experts who have visited these mines pronounce them among the most extensive on the continent. The supply of quartz is simply inexhaustible. All the way up Pritchard creek are some of the best claims known at present. The Widow, Last Chance, Butte, Sargent, Rockford, Ophir, Mother Lode and a dozen other famous properties are passed, within a distance of a mile and a half from Murray. The suburb of Butte is at the mouth of Butte gulch, and is connected with Murray by a string of cabins from 10 to 50 yards apart. On the south we have the tributaries Ophir, Idaho and Tiger gulches, and while bed-rock has not been reached in either of these, the gravel prospects very well. Thus it will be seen that fifteen side gulches put into Pritchard creek within a radius of a mile and a half. Many who have been in the Black Hills claim that the ground on the main creek alone is sufficient to make as large a camp as Deadwood.

Old Gravel Deposit.

The bar diggings are numerous, but the old gravel wash on the hills north of the town are the most extensive and the richest diggings that have been discovered in many years. The wash runs east and west, and intersects the various feeders of Pritchard creek from the north. At these points of intersection the claims have a double wash and are correspondingly rich. Several tunnels are in on the deposit, and it is certain that in more places there are several hundred feet of pay dirt. Many of the creeks can be drifted, and will therefore furnish employment to many miners during the winter months.

The Roads.

Murray has not alone these resources close at hand, but it is really the entrepot of the en-

tire country. It is the first important point reached by the Belknap and Thompson roads. Belknap and Thompson on the Northern Pacific railway are distant 28 and 30 miles respectively. A trail will shortly be completed to Carbon, and one already connects it with Eagle.

The town has a postoffice and express office, two banks, three blacksmith shops, thirteen merchandise stores, two hardware stores, saloons, three watchmakers, six bakeries, six lodging houses, two drug stores, and a host of doctors, lawyers, and others engaged in professional callings.

The present population is about 1,200 while 2,000 more are prospecting and mining in the gulches within a radius of a mile. These parties frequent the town to purchase supplies, etc. Many families comprise the population, and many more are coming. Many who are engaged in business here will soon have their wives and families, and make their homes here. This will give a stability to the country which cannot be gotten from any other source. When the sawmills are running and the wagon road completed, elegant buildings will take the place of the log structures now in use.

Mining.

Since in a single week in the East railroad stocks suffered a shrinkage greater than all the mines in the West have ever shown, we do not read any more funny stories of how New York gentlemen have kicked the men of the West out of their offices for merely offering a mine for sale. Exports fell off a few millions during the first quarter of the year, making it necessary to export some \$16,000,000 in gold, and suddenly the toy houses of the East began to totter. We wonder if some of those interested do not wish they had placed their money in Horn Silver, which is quietly paying 45 per cent per annum to stockholders, or in Ontario or in Wood River or in Butte? If the shipment of \$16,000,000 out of the country is such a calamity, then there cannot be any too much real good money in the country after all. True there is lots of wheat, a good deal of beef, any amount of pork and whisky; but somehow they are not of themselves sufficient to keep the wheels of commerce moving. Business like bread must have a leaven, and that leaven is specie. And so it comes back to the proposition which the Tribune has often advanced: that there is not another so legitimate a business in all this world as gold and silver mining. From the barren hills it draws something which all mankind covet; no man is wronged by its production; no man's property is made less valuable because of it; it speaks to the earth with a language as universal as that which was talked before the first brick was laid in Babel—all men understand it. It is, too, the same to all men. Camel drivers and kings alike respect it, and just in proportion comes loss of trade, poverty and ignorance; a falling off of charities and increase of lawlessness and vice. The horror of middle ages was due to the fact that the gold and silver of the world, had, to a great extent gravitated to the church and to the nobility of Europe, and trade, having no stimulant, faded and died. A part of the money which has been gambled off in stocks in New York, would, had it been invested in legitimate mining in the West, have returned to the investors a stream of gold. They would not see it because their eyes were dazzled. May be their visions are by this time a little cleared; a few more jolts like those they have been receiving may make them really wise. The desert holds out its arms to them, and offers them something which means \$10 or \$100 or \$1,000 for every dollar they invest. They will understand this after a while and will turn their faces this way, and those who never came will by and by learn that a dollar dug from the hills is better than any dollar obtained in any other way, for its production causes no loss to and no competition with any other business. Mining will grow in respectability now for several years to come.—Salt Lake Tribune

BERNICE DISTRICT.—A correspondent of the Reno Gazette says: The Golden Crown Company of Bernice District, Churchill county, has leased the Bothwell mill for the term of 12 months, and the mill will commence running on the Golden Crown ores on the first day of July. The company have been opening the mine for the past six months, and have now opened 700 feet of tunnels and inclines, and have completed uprisings from one level to another. The ores are free, and 100 tons was worked up to 85 per cent of the assay value by free milling process. The Wild Goose mine is being opened by the owners, and shows large quantities of high grade ores. The ores of this mine are base, and require roasting, but are high grade enough to justify the extra expense. The last 50 tons worked \$160 per ton. Quite a number of claims are being worked with good results. Among the number are the Utah, Silver Ridge, Alta and Big Chief ledges. The mill is well equipped, and has a Buckner furnace which treats the base ores successfully. There is plenty of ore now developed to run the mill for a year. The trouble between the miners and mill owners is now settled by the miners having leased the mill. This will be a steady bullion producing district for the coming year.

A LARGE number of deer forests in Scotland are going a begging for tenants.

Working Tailings.

A New Concentrating Apparatus.

An Enterprise reporter yesterday morning visited the large tailings reservoir in Six Mile canyon, just at the Sugar Loaf, where an experiment is being made by W. T. O'Neale and others in the concentration of the immense mass of tailings accumulated at that point.

The Apparatus

Was started up three days ago for trial, but it is not yet in regular operation, as the tank for holding the concentrations remains to be constructed.

That which first attracts the attention of the visitor is a large conical screen, placed horizontally outtop of a large tank. This screen is 15 feet in length. At the larger end it is 7 feet in diameter and five feet at the smaller end. The screen is made of wire cloth with fine meshes—No. 30—and is revolved by the power derived from an eight-foot water wheel that stands in the stream below.

The tailings are washed down at the reservoir by means of a hose and pipe, hydraulic fashion, and, entering a line of sluice boxes, are delivered into the larger end of the revolving screen. When the tank is full of water the large end is working under a depth of about one foot of water, while the small end does not touch the water. Inside of the screen is formed of strips of wood which resemble the thread of a screw, or rather the thread that is formed in a nut. This thread is about six inches in depth, and the pitch of it is such that any coarse stuff, as fragments of rock, bits of iron and the like, that will not pass through the meshes of the screen, is carried along through to the small end, where it is dumped out upon the ground as waste.

As the screen, for more than half its length, works under water, the weight of the tailings fed into it does not bear heavily upon the wire cloth of which it is formed. It is said that 200 tons of the tailings a day may be run through the screen, and yet the wire cloth will not need renewing for a year. As we have seen, the coarse and waste material is thrown out upon the ground at the smaller end of the screen, and we have nothing more to do with it. The fine sand, sulphurets and pulverized slickens, however, pass through the meshes and descend into the tank.

The Riffle Boxes.

By means of gates the tailings that have found their way into the tank are drawn off and pass into two lines of shallow sluices, the bottoms of which are covered with galvanized iron coated with a preparation of quicksilver. The metallic bottoms of the sluices are not flat, nor are they closely corrugated, but are arranged in the form of the long, gentle waves seen at sea—shallow troughs and flat ridges. This shape forms ripples and eddies every few inches, in which the tailings are detained and whirled about in the quicksilver covering the plate. A bit of wood thrown into these sluices is caught and whirled about in each ripple for some time before it escapes, and is caught and spun about in the next below. These amalgamated plates are useful for catching floured quicksilver and particles of gold. They are 15 feet in length and 2 feet in width. The quicksilver used is a composition, the secret of which is known only to Mr. O'Neale and one or two others. It attaches itself to iron more readily than does ordinary quicksilver to copper.

The Blanket Sluices.

After passing through the boxes containing the quicksilver plates, the tailings drop a few inches and then enter two strings of blanket sluices—sluices, the bottoms and sides of which are covered with coarse blanketing made with a long nap. It is in the nap of the blanketing that the silver sulphurets and the particles of iron pyrites containing gold are caught and held. They are much the same as ordinary blanket sluices, except that the blanketing is tacked fast to the bottoms and sides of the sluices. The blankets are not taken out to be washed, nor are they swept with brooms, as in the case of the sluices in common use. In the center the boxes rest upon a hinge, therefore may be tipped over till they stand at an angle of about forty-five degrees. A section fifty feet in length may thus be stood almost on edge. A small pipe of galvanized iron, filled with small holes, runs the whole length of these boxes, and is at the upper side where they are tipped over for washing. Water being turned into this pipe, the contents of the blankets are at once washed down into the lower side of the box, which, as it is then standing, forms a small V-shaped flume, down along which the concentrated material can be washed into the large tank provided for its reception, and from which it is taken to be worked in pans as are ordinary concentrations.

An Economical Arrangement.

The plan of washing down the tailings as they stand in the reservoir and bringing them to the screening apparatus saves all shoveling into carts or cars, and to bring the tailings to the concentrating machines costs the labor of but one man—the man that holds the hydraulic pipe. Two other men can attend to the screen and sluices. The tailings, as they lie in the reservoir, assay \$5 50 per ton. Assays were yesterday being made of the concentrations, and future operations will depend upon the results obtained from these samples. There is an immense deposit of the tailings, and from the

average assays it has been estimated that the whole contains not less than \$20,000,000 of the precious metals. If this great wealth can be saved to the world it will be a work to be proud of, and Mr. O'Neale and his partners in the enterprise will not only make a good thing by their venture but also greatly benefit this community and the whole country.

Quite a number of visitors inspected the apparatus yesterday while it was in operation, and all seemed much interested in the whole process, from the sluicing down of the tailings at the reservoir to the bringing forth of the concentrations ready for the pan or other process. The enterprise will be watched with much interest by our people.

Educational Exhibition.

The Bureau of Education of the Department of the Interior, in a recent circular, gives a list, the most of which is presented below, as indicative of what it is desired to treat in the educational exhibition to be held at the World's Fair at New Orleans in December next. It will be found to be of interest to educators, inventors, mechanics, scientists, artists, printers, professional and literary men students and others.

Plans and models of infant schools and kindergarten, orphan asylums and nurseries; system, management, furniture and appliances. Plans and models of scholastic establishments for town and country; system of management and furniture; books, maps and charts. Plans and models of scholastic establishments for adult and professional instruction. Appliances for the elementary teaching of music, singing, foreign language, bookkeeping, political economy, practical agriculture, and horticulture etc. Appliances for instruction of mutes and the blind. Specimens of the work of pupils of both sexes. Libraries and publications.

Plans and models for secondary instruction; lyceums, grammar schools, colleges, industrial and commercial schools. Classical works, maps and globes. Appliances for technological and scientific instruction and the fine arts. Gymnastics, fencing and military exercises. Telegraphy, photography and stenography.

Plans and models of academies, universities, medical schools, practical schools, technical and mechanical schools, schools of agriculture, observatories, scientific museums and laboratories. Apparatus, collections and appliances for higher instruction and scientific research; special exhibitions of learned, technical, agricultural, mechanical, commercial and industrial societies.

Specimens of topography, autographic proofs, lithographic proofs, engravings. New books and new editions of books already known, special libraries, periodical publications, drawings, atlases and albums.

Paper, card and pasteboard; inks, corks, and all things necessary for writing desks and offices. Objects made of paper. Registers, copy books, albums, account books, memorandum books; bindings, loose covers for books, cases. Various products used in water-color painting and tinting. Apparatus for the use of painters, draughtsmen, engravers and modelers.

Designs for industrial purposes. Decorative paintings, engravings for industrial purposes. Models and small articulated wooden models of figures, ornaments. Carvings, cameos, seals, and various objects decorated with engravings, objects modeled for industrial purposes, produced by mechanical processes, reductions; photostatue, casts.

Photographs, heliographic engravings, lithographic proofs, photo-lithographic proofs, photographic stereotypes, stereoscopic proofs, stereoscopes.

Wind instruments simple and wind instruments with key-boards. Stringed instruments.

Apparatus requisite for anatomical and histological work. Anatomical models and musical instruments. Apparatus and instruments for simple surgery and anesthetic apparatus. Surgical instruments and apparatus.

Apparatus for restoring persons apparently drowned or suffocated. Baths and hydrotherapeutic apparatus, gymnastic apparatus for hygienic purposes. Plans and models of hospitals, various asylums, houses of refuge, almshouses, lunatic asylums; arrangements and furniture for such establishments. Various apparatus for infirm persons, invalids and lunatics. Accessory objects for the medical, surgical and pharmaceutical services. Chests and cases of instruments and medicines for surgeons; means and apparatus for succoring the wounded on the battle-field; appliances, instruments, apparatus, and all things requisite for veterinary surgery.

Apparatus and instruments used for mathematical purposes, and illustrating practical geometry, land surveying, topography and geodesy; apparatus and instruments for measurement, optical and astronomical; physical and meteorological instruments; instruments and apparatus for laboratories and observatories, weights and measures.

Topographical, geographical, geological, hydrographical, astronomical, physical, and maps of every kind; terrestrial and celestial globes and spheres, statistical works and tables, etc.

THE production of the mines of the Hecla company, of Glendale, Montana, in 1883, was 2,602 net tons of lead, 598,472.71 ounces of silver, and 502.53 ounces of gold in the lead, and 683,695 lbs. of copper matte, containing 63,372.21 ounces of silver, and 308,519 lbs. copper,

MECHANICAL PROGRESS.

Softening and Hardening Cast Iron.

Questions have lately been asked as to the possibility of altering the texture or changing the qualities of cast iron by heating and chilling. In the respect of resistance to the superficial changes which are induced on steel by heating and sudden chillings, cast iron stands alone. It is amenable to the gradual influences of heat, but it will not contract nor harden, like steel or wrought iron, under sudden changes from heat to cold. And yet hard cast iron may be annealed, as it is done daily by tons, the heat being supplemented by the pyrogenous oxide of iron, the hot oxidized scale, such as is seen at the base of the blacksmith's anvil. It can be annealed also, if the articles are small enough, by being heated in a bituminous coal fire, and then hurried until cool in a bed of the coal shavings. This sort of annealing is entirely unlike that for hard wrought iron or obdurate steel, as in these cases only clean charcoal is to be used, any taint of sulphur being a source of injury. But in annealing hard cast iron the softening qualities of the sulphur contained in bituminous coal is what is required. Some of the most intractable specimens of cast iron, no larger in diameter than a pipe stem, that refused to yield in a genial charcoal fire when packed with bone, lime, and charcoal, softened to usable condition by one heating in bituminous coal.

As to hardening of cast iron there is no ordinary process that is generally convenient, except that of casehardening. In this the cast iron article should be polished as well as finished—the surface being made as homogeneous as can be—so that the flux of casehardening be given as large a surface for action as possible; for the composition of cast iron is a honeycomb instead of a solid; and it is not even a series of layers of fibres, as is wrought iron, or of a network of fibres as is cast steel, but it is a mass of material of which pure iron itself is not always the largest part. Recent improvements, however, have given the pure metal a preponderance over the foreign palpable matter and the air spaces. But this constitution is not common.

Even heating is necessary to caseharden cast iron; and yet the heat must be less than allowed for wrought iron and low steel, for at much less than the white heat for wrought iron or the "high heat" for carbonized steel, the cast iron would disintegrate. The cast iron should be heated to a soft red heat, and then sprinkled with powdered prussiate of potash and sal ammoniac in proportions of two of prussiate and one of sal ammoniac, and then immediately plunged into a cold water bath. It will not do, in the matter of casehardening cast iron, to return the iron to the fire, or to use the flux as a paste. Put it on as a powder, and plunge immediately into cold water.—*Scientific American*.

Corrosion of Cast Iron Pipes.

In the course of a paper read by Mr. McElroy before the Western Society of Engineers, on the causes of corrosion of cast iron pipes, the author observed that a prominent cause of corrosion is the class of materials used, and also the method of manufacture of pipes in ordinary foundries. In the first place, a cheap and easily melted pig is selected—specifications and the inspection of quality and mixture not being strict—and the castings (for convenience of handling) are generally made in greensand moulds laid at a slope of about 10 degrees from the horizontal. Impure metal is therefore run in a way that aggravates its defects. The core bars are coated with straw ropes, which may be more or less soft and loose, coated with loam, more or less soft and wet, and sprinkled with sand.

If not very carefully wedged, these bars will rise; and they are seldom stiff enough to resist the upward pressure of the molten metal. The usual spring at the center for the core of an 8 inch pipe is one-sixteenth or one-eighth inch; or as much as three-sixteenths inch with a 6 inch pipe. The metal, poured in from the upper end, first fills the lower section of the mould; and as it rises round the core to fill the upper section, its weight springs the bar upward to the extent indicated, making the casting thicker at the lower, and thinner at the upper side. The denser, hotter, and purer metal fills the lower portion; the impurities naturally floating upward to settle in the thinner metal as it cools. Here gather portions of the sand coating of the mould; while the bubbles of the metal, caused by the development of gas from the vegetable matter of the loam, and from its dampness, tend to perpetuate themselves in blisters and air cells.

The usual defects in these cheap castings are, therefore, inequality in thickness, air cells and blisters, sand holes, cold chutes from chilled metal, and mixtures of sand and iron. Such pipes are also frequently out of line, from the effect of unequal contraction. Pipes of this description are peculiarly liable to corrosion; containing as they do mixtures of metal of different densities, together with much graphite. The duration of such pipes in the ground is largely affected by the amount of disturbance they receive. If well laid at a good depth, and thoroughly backed, they may continue serviceable for many years; but their defects are likely to become suddenly prominent upon comparatively slight external interference. In

favorable circumstances they may last more than 30 years; but the majority if tested after less use will show flaws that would have insured their rejection if detected when new.

RAILROAD PROGRESS.—When the New York and New England railroad was built, engines with but two drivers were used exclusively, on the supposition that more could not be employed, because of the great number of curves. In course of time, however, the fallacy of this belief was shown, and now it uses consolidation engines of enormous proportions. Thus, one by one have passed away erroneous notions with reference to important mechanical facts connected with the operation of the railways of this country, giving to the traveling world increased safety, speed and comforts more rapidly than it is possible for the average mind to appreciate. In this connection we may also remark that the wonderful growth in this country of facilities for the manufacture of rails during the past few years is forcibly illustrated in the fact that for several days recently the Edgar Thompson Steel Works of Pittsburgh turned out over 700 tons of steel rails every day. At this rate, supposing the rails to weigh 56 pounds per yard, this one mill could produce in a year rails sufficient for about 2,500 miles of track. And this is but one of a large number of mills, several of which are doubtless able to turn out very nearly as large a product as that referred to. Certainly there is no immediate prospect that the railway interest of the country will require any addition to the present capacity for producing rails.

ALTERED ENGINE IMPROVEMENT.—A Cleveland (Ohio) man claims to have invented an engine which gives a working pressure in the cylinder of four pounds above the pressure in the boiler. It has two steam chests placed on the opposite sides of the cylinder. He claims that a trial made with one steam port and chest open gave as good results as could be obtained from an ordinary engine, and by turning on the steam on the opposite side a gain in power was made of fully fifty per cent. This result, the inventor says, can only be accounted for by the concussion of the two currents of steam coming together from opposite ports, or by the liberation of latent heat not heretofore utilized by the old way of applying steam to the cylinder. This improvement can be applied to an ordinary engine by changing the cylinder and valve gear.

GLASS BEARINGS.—To what purposes may not glass be put? Bearings made of glass are now being experimented with in the rolling stock of railroads in regard to their frictionless qualities. This material is a hard, clear substance, and must wear down smooth and give a fine bearing surface for an axle to rest upon. It is a non-conductor of electricity, if not of heat, and the fine particles have as good a chance to work down the bearings of the axle to a running fit as in the grinding in of a valve seat for a brass valve, and much power is expected to be saved by converting the wearing of a journal into some other agency, than by converting it into heat.

THE FUEL COST OF HIGH SPEED.—Some experiments have recently been made upon the Pennsylvania road, near Philadelphia, to ascertain the difference in the consumption of coal between running a train very rapidly and at a very low speed. The same conditions, same number of cars and similar engines were employed. The trains in each case run the same distance—119 miles out and back. Some stops were made. The fast train ran on schedule express time. The slow train ran at the tunnel pace of twelve miles an hour. The fast train consumed 6,725 lbs. of coal. The slow train consumed 4,420—saving effected 2,305 lbs.

SOLID DRAWN STEEL TUBES are made in England and imported upon order. They are quite smooth and straight, both inside and outside, and will stand great pressure. Most of the demand is for hydraulic purposes. The importer of these tubes informs us that the largest size now made is 4½" outside and 4" inside diameter, and this size costs \$5 a foot. The demand is increasing, and the works run day and night. A very large amount of money was spent in experimenting before the process was made entirely successful.

IMPROVED BOILER TUBES.—In order to obtain the greatest possible efficiency in the steam-heating surface of boilers, a new kind of vertical steam boiler has recently been invented by a Mr. Armer. To obtain this efficiency, the boiler tubes have a helical twist given them, which does not interfere with the ease with which they may be cleaned, but which causes greater impingement of the gases against the tube walls, and gives more freedom for expansion than straight tubes.

A CORRESPONDENT in *Engineering* refers to the small amount of power absorbed in engine and pump friction in the published tests of American pumping engines, and hints that the reason may be due to the internally packed pump plungers, by which leakage cannot be readily detected. Equal results he says are never reached in England, and thinks there is something of the "white elephant" about them.

SCIENTIFIC PROGRESS.

Colors Produced by Photographic Printing.

An engraver and amateur photographer of Paris recently announced that he had discovered the art of taking photographs in colors, and asked of the Minister of Instruction for a grant of money to make his invention public. Quite an interest was excited both in scientific circles and among the public, and the inventor was invited to give a public exhibition of his work in the presence of the Minister and several scientific and photographic experts. The latter reported as the result of their observations and investigations that the inventor had not succeeded in reproducing natural colors by photography; but that being only an amateur he had probably deceived himself and produced simply a combination of mechanical and chemical results, which is quite interesting and is described by a Paris correspondent as follows:

Take a negative of a picture, print the image very slightly upon salted paper—that is to say, paper prepared with a chloride and then sensitized upon a silver nitrate bath. Upon this skeleton of an image must be painted the colors of the original picture, and that as similar as possible. The colors to be used must be those mixed with albumen. Such colors are sold in England under the name of "moist colors." When the coloring is completed the paper is floated upon a solution of albumen salted with a chloride. When dry the paper canvas, or other material is sensitized upon a silver nitrate bath, and when dry it is placed in juxtaposition upon the negative. The photographic image is now fully printed out, as in an ordinary silver print. The image is then plunged into a solution of hyposulphite of soda, and when fixed it is well washed and then dried. All the colors can be seen through the albumen, the photographic image giving the half-tones and shades—in all presenting a very pretty appearance, and quite capable of inducing any one to cry out "Wonderful!"

This is the history of photography in natural colors which has made so much noise—not only in scientific circles, but also among the public—during the last few days.

LIQUID CARBONIC ACID.—It appears, as a result of the labors of Dr. Raydt, of Hanover, that liquid carbonic acid is speedily destined to take its place as an article of commerce, susceptible of important chemical and mechanical applications. The liquid is contained in wrought iron or steel cylinders, holding 10 liters, in which this quantity of liquid, under a pressure of 36 atmospheres represents 450 times its bulk of gas. Dr. Raydt's improvements comprise not merely the commercial production of liquid carbonic acid, but also relate to the arrangements for disengaging it at a regulated pressure. When the price of this liquid is sufficiently low, it will find many uses wherein great pressure is required to be applied within a small or confined space. At Krupp's Steel Works liquid carbonic acid is used to compress cast steel while cooling in moulds. For this purpose, by heating the reservoir of liquid to 20° C., a pressure of 1,200 atmospheres has been obtained. In this form also pure carbonic acid in considerable quantity, for chemical purposes, may be easily stored and transported.

THE PRESENT LIMIT OF MICROSCOPIC VISIBILITY.—Although there is perhaps much to be desired in the improvement of microscopic objectives, we may still consider our present state quite an advanced one. Although the present theoretical limit of visibility is fixed at 146,528 lines to the inch, we need not be deterred from attempting to pass this point. The limit which was accepted some years ago as the true one, although considerably lower, was quietly ignored as the angular aperture in objectives increased. It is only a few years ago that the majority of microscopists refused to believe that *A. pellicida*, which has about 100,000 lines to the inch, could be resolved, and now it is the work of beginners to do so. But supposing 146,528 lines to be the limit, it is evident that a one-eighth or one-tenth objective with a one-half inch eye-piece is of amply sufficient magnifying power to make the lines visible to the eye, and there is therefore no need of using more. It is a good rule to follow, under all circumstances, not to use a greater power than is necessary to comfortably do the required work.—*A. Bausch*.

PURIFICATION OF WATER BY MOTION.—A discovery has been made by Dr. Pehl, of St. Petersburg, which promises to have a very important bearing on many industrial processes. The water of the river Neva is very free from bacteria, having only about 300 germs in a cubic centimeter. The canals of St. Petersburg, on the contrary, are infected with bacteria, their number reaching 110,000 in a cubic centimeter, even during good weather. The same is true with regard to the contents of water for the supply of the city. While the chemical composition of the water passing through these conduits hardly differs from that of the Neva (by which they are supplied), the number of bacteria reaches 70,000 against 300 in the water freely taken from the river; and the worst water was found in the chief conduit, although all details of its construction are the same as in the secondary conduits. Dr. Pehl explains this anomaly by the rapidity of the motion of the water, and he

has made direct experiments in order to ascertain that. In fact, when water was brought into rapid motion for an hour, by means of the centrifugal machine, the number of developing germs was reduced by 90 per cent. Further experiments will show if this destruction of germs is due to the motion of the mass of water, or to molecular motion. If this discovery of Dr. Pehl is confirmed, it will become possible to destroy bacteria, and render a water comparatively pure, simply by passing it through a centrifugal machine. The subject is of special interest to brewers, who suffer, perhaps, more than any other manufacturers, from the attacks of bacteria.

MAGNETIC FRICTION. The peculiar circumstance that in certain dynamos the cores of the electro-magnets gradually heat up, their temperature continuing to rise even after the machine has stopped working, has led to some interesting experiments recently conducted by two German scientists, Messrs. Warburg and Honig. A number of explanations have already been offered for this peculiarity, none being that the draft created by the machine when working keeps the temperature down by carrying off heat, whereas when the machine stops the draft ceases. It has been argued, on the other hand, that the Foucault currents, or the magnetic friction causing heat, do not cease to operate on the stoppage of the dynamo, and the result of the investigations just mentioned seem to indicate that the heat is mainly due to magnetic friction. In carrying out the experiments a core of iron was carefully magnetized by a coil, and the heat generated was measured in an ice calorimeter. If the heat depended only on the electrical resistance of the iron to the circulation of the Foucault currents, and if the coercive force of the iron was zero, Messrs. Warburg and Honig argued that they could calculate the heat generated by two cycles of magnetization. The calorimeter, however, showed a different result, and it was concluded that nearly 75 per cent of the heat was due to magnetic friction.

THE GREAT SPOT ON JUPITER.—In a recent report of Prof. G. W. Hough, the director of the Dearborn observatory, to the Chicago Astronomical Society, that gentleman among other things says that the recent spot on Jupiter, which has attracted so much attention from astronomers and others, is not the first time such a phenomena has been noticed on that planet. In the years 1664, 1665 and 1666, a great spot, with a diameter of some eight thousand miles, or about one-tenth that of Jupiter, was observed by Hook and Cassini, and situated in latitude 6° south of the planet's equator. The spot reappeared and vanished eight times between 1665 and 1708, was invisible from this latter year until 1713, and the longest period of its continuous visibility was three years, and of its disappearing, five. Professor Hough suggests the possible identity of that great spot with the present one, taking much the same ground with Russell, of Sydney, that it is a portion of the solid body of the planet, or *Jupiter firmus*, so to say, and when not seen is simply rendered invisible by a covering of clouds.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE will hold its annual meeting this year at Philadelphia. The British Association holds its meeting at Montreal, just previous to the Philadelphia meeting, and it is expected that many of its members will attend at Philadelphia meeting, which will no doubt have one of usual interest and value, so much so that Congress will in some way facilitate the active participation of the several government scientific bureaus. Interesting and valuable contributions from European sources are confidently expected.

OIL USED TO QUIET THE WATERS AS EARLY AS THE SIXTH CENTURY.—M. Henri Parville, in the *Paris Debats*, quotes a reference to the singular action of oil on waves by Theophrastus, the Byzantine historian of the sixth century. As the wind, he says, is a "subtle and delicate thing," and oil is "adhesive, unctuous and smooth," the wind glides over the surface of the water on which oil has been spread, and can not raise waves.

CURIOSITIES OF MAGNETISM.—If an iron wire be twisted during or soon after the passage of a voltaic current through it, the wire becomes magnetic. When the wire is twisted in the manner of a right hand screw, the point at which the current enters, becomes a South pole; in the opposite case it becomes a north pole. If during the passage of the current, the wire be twisted in different directions, the polarity changes with the direction of the twist.

PURITY IN METALS.—The characteristic sign of purity in metals is the power of crystallization; the purer the metal the more ready and perfect the crystallization, and the less its cohesive strength. Zinc, when quite pure can not be rolled into sheets, but when mixed with a small percentage of lead, it becomes very ductile. Gold has to be alloyed with copper or silver to make it suitable for use in arts or commerce.

A NEW GOOSEBERRY.—Three new species of flora are reported to have been discovered by Rev. E. S. Green, a botanist of Santa Barbara. In the Middle of San Luis Obispo County he has also discovered a new species of gooseberry wholly unknown to science. Near Soledad he came upon a new species of olive tree, peculiar to California.

THE *Coeur d'Alene Eagle* says it is positively no exaggeration to say that every gulch in a radius of ten miles from Eagle yields fair prospects, while many of them are very rich.

The Government of the United States never intended to make any money out of the Patent office. No money is received for its support or maintenance, from taxation. Every dollar is paid by those who have business with the office—the inventors of the country. In view of the large surplus, and the fact that the inventors pay for their work, it seems too hard that the business of the office should be trans-

A Lode Claim Within a Placer Patent.

A very important decision has been rendered in the Supreme Court of the United States, to the effect that in an action by the patentee of a placer claim to recover possession of a lode within its boundaries, where the lode was known to the patentee at the time of applying for the patent, and he did not include it in his application, he is precluded from any right of possession of the vein. The action was brought by the Iron Silver Mining Co., owning the Wells and Moyer placer claims in Colorado, against Sullivan and others to secure possession of a lode on the placer claim.

The Government, when it issued the patent to the Wells & Moyer claim, gave the veins or lodes which might thereafter be discovered, but expressly excepted and excluded them from rights of any lodes then known to exist. The amended answer to the complaint alleged "that at the time of the location of the placer claim and application for the patent, a silver lead lode was known to exist under the surface of the placer claim." The defendants claimed that the failure to include this vein in the application of patent by the complainants amounted to a conclusive declaration by the patentees that they made no claim to the lode.

The defendants went on the land on January, 1883 the placer patent issuing on January, 1879 and located the vein, complying with the legal requirements of posting notice, marking surface, etc. The defendants therefore claimed the vein.

The plaintiff denied their statements, and said that the lode was not located before the placer patent was issued, nor had it even been discovered at the time, but that the defendants located their lode claim within the boundaries of the patented ground after the issuing of the placer patent; and because the applicants for the placer patents were not required to apply for the vein or lode claim unless it had been duly discovered, located and recorded, it was owned by the applicants for the placer patent at the time of applying for the patent.

The Circuit Court in Colorado, sustained the demurrer to the amended answer and gave judgment for the plaintiff, and the defendant sued out the writ of error.

The case was appealed to the Supreme Court of the United States. The whole case had to be decided under section 2333 of the Reserved Statutes, which defines the question of lodes in placer claims.

The counsel for both parties in their arguments discussed the question whether a vein or lode included within the boundaries of a placer claim, the application for which does not include an application for the vein or lode claim, is excepted out of the patent for the placer claim, if at the time of the application it is known to the applicant to exist, but no claim to the vein or lode has been located.

In accordance with the view expressed by the Circuit Court in the opinion delivered on sustaining the demurrer to the original answer, the defendants in error maintained that by virtue of section 2333, taken in connection with 2320 therein referred to, a vein or lode within the boundary of a placer claim is not excepted from a patent for the placer claim for the vein or lode had previously been located according to section 2320.

The plaintiffs in error contend, that if the existence of the vein or lode is known to the applicant for a placer claim, he must include in his application for the placer claim an application for the vein or lode claim, and pay for the latter at the higher rate, in order to obtain any title to it.

The Circuit Court treated the question of the construction of this statute as one of much difficulty and of some doubt, and as affecting numerous cases. The Supreme Court should not express an opinion upon it unless its determination is necessarily involved in the adjudication of the case at bar.

The Court said: We are of opinion that the question is not presented for adjudication by the record before us. The amended answer alleges that at the times of the location and survey of, entry upon, and application and patent for the placer claim, the lode or vein was known to exist, and was claimed to exist, within the boundaries and underneath the surface of the placer claim, and the fact that the vein was claimed to exist and did exist within the premises, is and was known to the patentees of

that claim. The phrase, "claimed to exist," as used in the amended answer, apparently intending to follow the form of patent therein set forth, is not, indeed, a statement that a claim for the vein or lode has been in due form made and located, but only that it was contended that the vein or lode existed. But the further allegation in the answer that the vein was known by the patentees to exist at the times mentioned, is an allegation, in the very words of the statute itself, of the fact which the statute declares shall be conclusive against any right of possession of the vein or lode claim in a claimant of the placer claim only.

Whether the words "known to exist," as used in the statute, are satisfied by actual

Daily Inspection of Mines.

The periodical inspection of the hoisting appliances on mines is not by any means neglected among us on this coast, where the ropes are carefully attended to and examined by competent men, specially detailed for the purpose. But we have no government regulations on the subject or state laws, and the matter is left pretty well to the superintendent himself. In the large mines it is more neglected, though in smaller ones daily inspection is not carried out as a general thing. In Great Britain the laws require the working places of coal mines and the roadways leading thereto to be examined, before they are entered by the workmen. The inspectors have been trying also to

vogue for at least 11 years.—Mr. Arthur Henry Stokes, Assistant Inspector of Mines, said that he did not consider an inspection of the mine five hours before the shift was sufficient to ensure the safety of Shireoaks Colliery. He had inspected it for 11 years, and he considered it a fairly ventilated one. He considered it a physical impossibility for a man to properly examine 10 miles of roads and workings, as the deputies had to do here.—Mr. Walter Salmon, managing director of the Plaxton Colliery, said their pits were examined every two hours, but they worked with naked lights. Mr. Fred K. Channer, certified agent for the Butterley Company, said that in their collieries, numbering 27, they inspected within two or three hours of the commencement of work. Mr. Joseph Humble, manager for the Staveley Company, said they got about 900,000 tons of coal per year, and they examined within three hours of the commencement of the shift, and found no practical difficulty in doing so.

The defense contended that inspections at Shireoaks had been made in compliance with the second general rule, and that the Act did not record any special time limit, and therefore no time limit could be imposed.

The summons charged Mr. Wright with not having on a particular day inspected the mine with safety lamps before the men went to work, but the witnesses called in support of the case proved that they did inspect. The deputies told the Court that they examined one place five hours before the men went to work.

It was not a question of economy, as the management were willing to adopt every precaution necessary for the safety of the men. It was their contention that if this theory of inspection were carried to a great extent further it would entail much more serious evils than those they were endeavoring to cure. It was finally decided that as long as the mine was inspected the law had been complied with, and that the inspectors could not force the mine owners to any specified time for examination.

Academy of Sciences.

A meeting of the Academy was held on Monday evening last, Dr. H. W. Harkness in the chair. A twelve-pound fish, *Seriola oblonga*, caught off Monterey, was presented by A. Paladini. Rev. Edward L. Greene presented specimens of a new flowering plant collected by himself last April, on Tulare plain. It is a new generic type and is now named by Mr. Greene, *Crockeria chrysantha*, in honor of Mr. Charles Crocker, in recognition of his generous patronage of California botany. Dr. H. Hermann Behr, spoke of the army worm, comparing endemic with epidemic insects, and exhibited moths and germs caught in this State. The introduction of the European sparrow, which preys on insect-feeding birds and insects, has done us great injury, by allowing pests to multiply among us. Professor C. A. White, of the United States Geological Survey, now engaged on this coast in paleontological explorations, said the English sparrow drives off native birds, and its introduction anywhere is unfortunate. He said great activity now exists at Washington in every branch of science, and the whole country is awake. Paleontology is a continuation of zoology and botany, reaching back into the age of fossils. Washington has now become the great centre of biological science of the world. The United States Fish Commission is doing much excellent work, and the U. S. S. *Albatross* has just returned from her first cruise. The United States steamer *Fish Hawk*, is also at work.

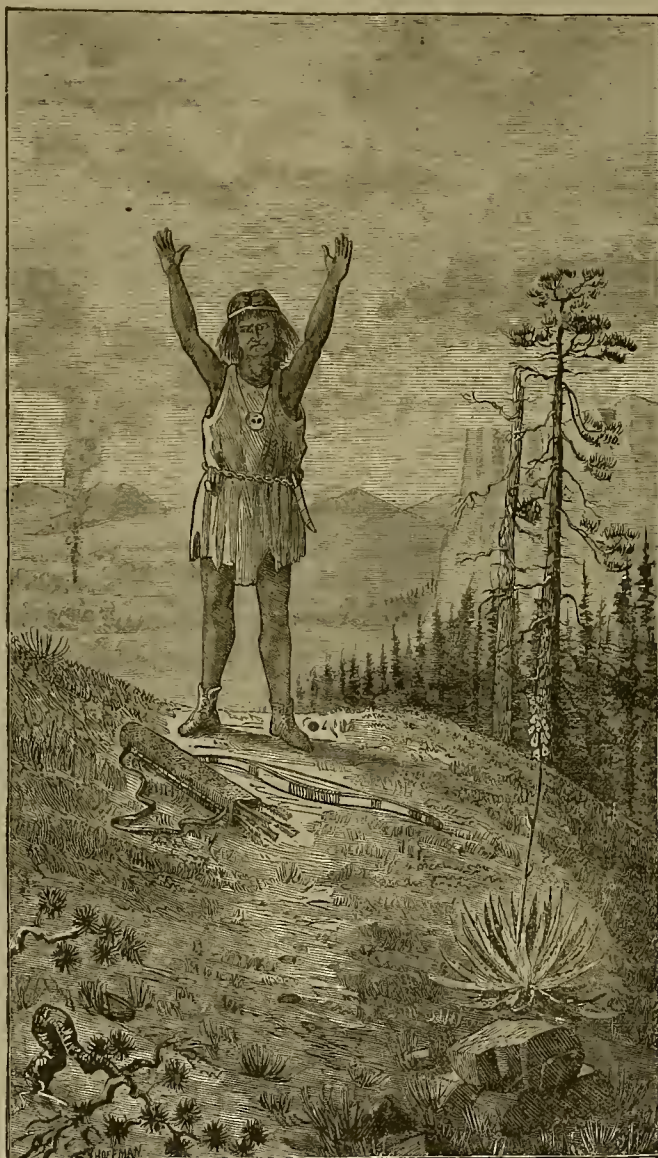
Indian Signals.

In the Press of February 2d we made an extract from the publications of the Bureau of Ethnology of the Smithsonian Institution, and gave an engraving of a form of Indian signaling. That represented an Indian giving the signal of discovery or alarm.

These signals are actions of manifestations intended to be seen at a distance, and not allowing the minuteness or detail possible in close converse. Signals may be executed, first, by bodily action; second, by action of the person in connection with objects, such as a blanket, a lance, or the direction imparted to a horse; third, by various devices, such as smoke, fire or dust, when the person of the signalist is not visible. When not simply intended to attract attention, they are generally conventional, and while their study has not the same kind of importance as gesture signs, it possesses some peculiar interest.

The engraving given herewith is a representation of a signal of peace or friendship. The hands, with open palms, are elevated over the head. This signal, meaning "No Arms," was first noticed by Dr. Hoffman in 1871 in northern Arizona, and is used by the Apaches, Mohaves, Wallapais and Seviches.

Aside from its ethnological interest the engraving is of general value as giving a glimpse of the peculiar vegetation and the topographical features of the Arizona landscape.



INDIAN SIGNAL OF PEACE OR FRIENDSHIP.

knowledge of the applicant, or imply also a located claim for the vein or lode, the same meaning must be attributed to them in the amended answer; and the fact signified by the statute is well pleaded, for by the elementary rules of pleading, facts may be pleaded according to their legal effect without setting forth the particulars that lead to it; and necessary circumstances implied by law need not be expressed in the plea. In order to present the issue discussed in argument, the plaintiff should either have traversed the allegation or have replied that no claim for the vein or lode had been located at any time in question.

We find nothing in the statutes of Colorado which changes the rules of the common law in this respect. The judgment must therefore be reversed, and the case remanded to the Circuit Court, with liberty to either party to move in that Court to amend pleadings.

G. F. WILLIAMS, formerly Superintendent of the Spring Valley hydraulic mine at Cherokee, in this State, has left for London en route to South Africa, to take charge of gravel mines there. It is said his salary is to be \$15,000 a year. Mr. Williams is a talented young mining engineer, son of the late A. F. Williams, of Oakland. His experience in California will be of great service to his employers in Lydenberg district, Transvaal.

have this examination made not more than two hours before the miners enter. In a recent case the manager of the Shireoaks Collieries, was summoned at the instance of Her Majesty's Inspector of Mines for the Midland district, for not having the workings of his colliery inspected within a reasonable time of the commencement of work on March 14th and 31st in accordance with General Rule 2, whereby he was guilty of an offense against the Act, and had become liable to a penalty. It appears that towards the close of last year, Mr. Evans, by order from the Home Secretary, sent a circular letter to the colliery proprietors in the Midland district, requesting them to have all the workings inspected within four hours of the commencement of work. A meeting of the proprietors was held, at which a resolution was passed strongly condemning this circular, and protesting that it was unnecessary to accede to its request. The present case, therefore, was regarded as a test case, and great interest was centered in the proceedings, gentlemen connected with the mining interest being present from all parts of Yorkshire, Derbyshire, and Notts.

On behalf of the Government Inspector it was contended that the Act had not been complied with, and called the deputies from the collieries, who proved that in the case of some of the workings an inspection had not been made within five hours of the commencement of the shift; but in others an inspection had been made immediately before the workmen entered. They also stated that this system had been in

Borax.

Production.

The following table shows the annual and total production of refined borax made in California and Nevada during the past ten years:

	Pounds.	Pounds.
1873.....	2,000,000	1,584,966
1874.....	4,000,000	3,860,748
1875.....	5,438,658	4,045,405
1876.....	5,180,810	4,236,291
1877.....	3,727,290	
1878.....	2,802,800	36,871,958

Adding to the above an estimate of 1,000,000 pounds, made prior to 1873, gives a total, to the close of 1882, of 37,871,958 pounds—equivalent to 18,935 tons of 2,000 pounds each.

The census authorities reported the product for the year ending May 31, 1880, as follows:

	Quantity, Pounds.	Value.
California.....	1,422,443	\$107,333
Nevada.....	2,270,000	169,900
Total.....	3,692,443	\$277,233

Of the production made in 1882 the quantities produced at the different leading refineries were as follows:

	Pounds.
The San Bernardino Company.....	1,540,000
The Teel's Marsh Company.....	2,099,539
The Pacific Company.....	251,000
The Nevada Company.....	82,200
Various small companies.....	263,552

The borax made in this country finds its chief market in London and New York. Small lots are also exported to Germany, China, Japan and various other countries, and of these the larger portion goes to Germany.

Exports.

The shipment of borax by sea from San Francisco in 1882 were 1,053,856 pounds, valued at \$114,310.21.

In 1882 there were 998,578 pounds carried east by the railroads.

The domestic receipts of borax at San Francisco in 1882 were 4,236,291 pounds. The domestic receipts of borax at San Francisco since 1876 is as follows:

	Pounds.	Pounds.
1882.....	4,236,291	2,663,000
1881.....	4,000,200	3,530,300
1880.....	4,008,600	3,143,000
1879.....	1,038,400	

Composition.

An analysis of a sample of California refined borax, from San Bernardino county, the production of the San Bernardino Borax Mining Company, was made by Mr. Edward Booth, for the California State Mining Bureau. It is as follows:

Borax—Water, 47.05; biborate of sodium, 52.80.....	99.85
Chloride of sodium.....	Trace.
Sulphate of sodium.....	Trace.
Insoluble residue.....	Trace.

An analysis by the same chemist was made of a sample of concentrated borax from the works at Esmeralda county, Nevada, and of the insoluble residue which interferes with its crystallization, as follows:

Borax—Water, 46.25; biborate of sodium, 52.68.....	98.93
Chloride of sodium.....	.50
Sulphate of sodium.....	.25
Insoluble residue.....	.38

The insoluble residue consists of—

Water.....	9.00
Organic matter.....	6.40
Silica.....	73.32
Sesquioxide of iron.....	1.42
Lime.....	3.87
Soda.....	5.51
	99.52

History of the Borax Industry of the Pacific Coast.

In considering the industrial and commercial history of borax on the Pacific coast, it is found that it has been marked by disappointment and loss almost from the first. Prior to any production being made in Nevada, the price of this salt ruled everywhere at 28 to 35 cents per pound, figures that held with but little variation up till 1872, when the price dropped during the next two years as low as six and a half cents in the San Francisco market. After touching this low figure the price of refined borax underwent some slight improvement and advancing slowly, reached, about two years since, present rates, 11 to 13 cents per pound in New York, the controlling market in the United States. This sudden extreme, and long-continued depression in the price of borax was due to the following principal causes, not to mention others of minor import:

As did the Pioneer Company in California, so did their successors at a later period greatly over-estimate the extent and richness of their deposit, as well as the rapidity with which the original stock, when removed, would be likely to replace itself. Spreading abroad, these exaggerated reports caused the foreign dealer, fearing an over-production, to buy sparingly, a course that soon began to work a reduction in prices. The manufacturer, alarmed at this new arrival in the field, began also to mark down the prices, making arrangements to enlarge his production at the same time, and thus the market became badly demoralized before these salines had as yet made any large output, or any over-production had actually occurred, this latter, in fact, an event that never came to pass. Meantime, the Nevada producers met with disappointment on every hand. Their deposits were by no means as fruitful as they had anticipated. Being inexperienced in the business,

they failed to put their borax upon the market in presentable shape, from which they suffered some discredit. The product of their refineries was disposed of hastily, and through such diverse channels as soon placed them in the attitude of mutual competitors, the hope of each company that they would, through the superior excellence of their deposits or their sharper management, be able to undersell their neighbors, having prevented them from entering into any concerted action. Having been persistently kept up, these evils and errors developed such obstacles as, in the course of a few years, forced everyone of these companies to greatly curtail or wholly suspend operations; the production of borax on the Pacific coast having fallen off before the end of 1879 more than 70 per cent from the largest amount previously made. With some advance in the price that took place in 1880, several works started up again, others having followed as prices further improved, until the present complement was got under way.

In calculating their chances for success, the Pacific Coast manufacturers made the double mistake of overestimating their own and under-estimating the resources of foreign producers. It was supposed by these novices that the previously prevailing high prices of this commodity the world over were due to a scarcity of the raw material, or the difficulty of obtaining it in the countries where the principal supply was drawn—a manifest error, inasmuch as the borate deposits of Europe, India and Peru, at the time the new industry was striving for a foothold on the west coast of the United States, were ample to meet all the requirements of commerce the high prices that had always before obtained being the result of well-perfected combinations through which the entire business was controlled by a few persons, who, besides controlling the trade, were able to supply any increased demand that might arise, and do so at reduced prices, were this necessary. These parties were therefore in a position to become dangerous competitors of any new rival entering the field.

The manufacturers of borax on the Pacific coast labor under many disadvantages as compared with producers elsewhere. Labor and other factors of production are dear; the borate fields are located in desert regions, which afford few facilities for carrying on the business of refining, being at the same time distant several hundred miles inland from San Francisco, the principal entrepot and shipping point for the entire country. After shipment at San Francisco the borax has to make long journeys by sea or land to reach the great marts of the world.

The recent discovery of heavy deposits of borax near the Sea of Marmora, Asiatic Turkey, has also had a depressing effect.

Wages, Etc.

The following statement of expenditures made by the San Bernardino Borax Company on account of labor and supplies for the month of March, 1883, fairly represent expenditures of the other borax companies, both in California and Nevada, on account of these items:

WHITE LABOR.			
Employees.	Wages.		
	Per day.	Per month.	
Clerk at mine.....		\$125 00	And board
Agent, (Mojave).....		100 00	Do.
Blacksmith, 1st.....	\$5 00		Do.
do, (helper) 2d.....	3 00		Do.
Engineer.....	4 00		Do.
Teamster.....		100 00	Do.
Swampers.....	1 95		Do.
Fuel teamster.....	3 25		Do.
Coopers.....	3 25		Do.
Boilermen.....	2 31		Do.
Watchmen.....	2 31		Do.
Laborers.....	1 95		Do.
Cook.....		50 00	Do.
CHINESE LABOR.			
Foreman.....		50 00	No board.
Laborers.....	1 25		Do.

At cost of \$1 per day.

Total white labor list, 25 men, 31 days, March..... \$1,804 96
Total Chinese labor list, 35 men, 31 days, March..... 1,400 03

Total monthly expenditure for labor..... \$3,204 99

The forage consumed during the month of March, 1883, at the works of the San Bernardino Borax Company, was as follows:

Horses and Mules.	Hay.		Barley.		Total Cost.
	Pounds.	Value.	Pounds.	Value.	
2 large teams, 40 animals...	10,050	\$228 71	19,595	\$391 90	\$620 61
35 animals...	15,900	213 75	15,636	312 72	526 47

REMARKS.—Fifty cents per day cost per animal; two transportation teams; 85 miles wagon haul. Teams at the works.

The average monthly wages in borax manufacture in Nevada in May, 1883, were as follows: White laborers, \$45 and board, which is equal to \$75; Chinese, \$40, board themselves; superintendents, \$60 to \$75 and found; teamsters, \$50 to \$60 and found; blacksmiths, \$75 and found; mechanics, \$75 and found; engineers, \$100 and found; firemen, \$50 and found; tinsmiths, \$75 and found.

The Eastern Market.

Inquiry among refiners and dealers in New York city, developed the fact that the domestic borax is generally preferred to that imported, being usually superior to corresponding grades. For jeweler's uses, however, English refined borax has been imported. The chief impurities

in the American borax are organic substances, and excess of water and soda. For many uses the refining is rather to produce a better-looking product than because of absolute necessity. Refining consists simply in dissolving the crude or half refined borax in water, settling, and slowly recrystallizing.

The leading uses of borax are in welding (for which the greater part is consumed, in iron and steel manufactures); in refining metals, as a crucible flux; in enameling; by packers, in preserving meats; and as a detergent for household purposes.

The price of American borax in New York at the close of 1882, was as follows: California refined, 13½ cents; New York refined, 13½ to 13½ cents; crude 10½ to 11 cents.

Tinical, (crude borax) comes from the neighborhood of Calcutta, India; crude borate of lime from the west coast of South America; boacic acid from Tuscany. Refining is carried on to a considerable extent in England.

Tariff.

The new tariff rates are as follows: Refined borax 5 cents per pound; pure boracic acid, 5 cents per pound; commercial boracic acid, 4 cents per pound; borate of lime, 3 cents per pound; crude borax, 3 cents per pound.

Snake River Placers.

Placer mining being the great industry of this portion of Idaho, it is proper to give the points on this subject. The Independence mining district, situated near Minidoka, or fifty miles east of Shoshone, shows signs of more vigorous action this summer. The Hamburg Bar Company, ten miles southeast of Minidoka, employs two men, and as soon as the river ceases rising will begin concentrating and retorting their product. This mine is the oldest in the district and its product is of the finest, assaying 960 fine.

The company will use Heuschkel's process on their black sand, and a new water motor for filling their sluices from Snake river. Coming down the river the next mining property belongs to the Boston Placer Mining Company on the south side of the river. The active operations of this company are at present confined to their upper properties at Bonanza Bar, thirty miles above. Mr. S. D. Gilbert, the President, is now figuring on putting up one of the new motors of which more will be said hereafter.

Superintendent Goddie, of the Midas Mining Company, has received a No. 12 Heald & Sisco centrifugal pump and is only awaiting the subsidence of the river to put it in position. This pump will be operated by a fifty horse-power engine and sixty horse-power return flue boiler, which will supply about 900 miners' inches of water. The work of this company promises to be on a gigantic scale this season. Its ground is very fair and will produce, when properly worked, a large quantity of gold. The Idaho Mining and Development Co. has a very fine bar just below the Midas. Its machine will be operated by water raised from Snake river by an improved automatic motor, the invention of Job Smith, of Utah. This machine is on floats with a scaffolding as high as it is wished to raise the water. A series of floats forming a water wheel (axes on the periphery) is set in motion by the current of the river, thus operating an endless link-belt to which are attached floats on the principle of the chain pump. The water is drawn by those floats into a pump tube extending from beneath the river level to the height it is desired to raise the water. Once in operation, this machine is run by the river, thus costing nothing to run it. Its construction is so simple that the initial cost covers everything and its capacity for raising water is only limited by the size of the pump tubes and the dimensions of the motor, thus fitting it for operation on those high rich bars on the river hitherto inaccessible to miners on account of the difficulty in procuring sufficient water. A careful study of this machine and its capabilities will show its usefulness for irrigating as well as for mining. Messrs. Baker and Ludge, of Minidoka, are the owners of the right for the Territory of Idaho, both for mining and agricultural purposes, and they hope through the agency of this powerful and economical motor to see the irrigating canal for cultivation meandering its peaceful way along both banks of the Snake river for many hundred miles before another decade shall have passed. This seems certainly a feasible project, and vastly cheaper than to obtain irrigating facilities by diversion. The Vulcan Company next below the Idaho Company's grounds, is idle for the present, although it has machinery and a mill, only awaiting the word "go" from Mr. Davis, the owner in Obeyenne. The water is higher in Snake river by six inches than it was last year, and with heavy rains nearly every afternoon the water is still raising.—*Idaho Statesman.*

AN IMPROVED ORE CRUSHER.—In Utah there is said to be an improved crusher just out—an improvement on Blake's—that will crush one ton per hour so that it will go through a 45 screen—fine enough for leaching, and probably for roasting and amalgamating. The wearing parts of this crusher can be furnished for \$250 a year, and it steadily at work. These improvements promise an immense reduction in the cost and maintenance of ore-reducing plants, in the cost of extracting the precious metals, and consequently the rendering available of many ores heretofore worthless by reason of their poverty.

Spring City Notes.

A correspondent of the *Silver State* says: The Paradise and Wild Goose mines, under the superintendency of J. V. McCurdy, and the foremanship of T. D. Soper, have been opened up and developed in a systematic and skillful manner and show conclusively that all that is required to make this one of the most prosperous mining locations in the State is to put the right man in the right place, and that others of our mining camps in this county, which have almost been abandoned, might prove valuable. It may be said that the Paradise mine was virtually abandoned for several years and pronounced worthless by some of the company's former superintendents, who were undoubtedly better mining men when sitting about an office stove in the city than when in the mountains; but Mr. McCurdy has demonstrated beyond a doubt to the mind of any reasonable man that the mines in this locality are both rich and permanent. There are other claims here which would astonish you; should you see them, you would naturally wonder why it is that the mining men of means do not take hold of such property and build reduction works and work them, which can be done with profit.

The Live Yankee and Big Nick, owned by Nick Freyer, contain and now show, with the present development, thousands of tons of ore which would yield a fair profit had he a mill at or near the mines, while Mr. Freyer has ore of a very high grade at or near the surface which is rich enough to ship to Salt Lake. He realized several thousand dollars, and could have realized a great deal more had he reductions works of his own; but he, like a thoroughbred, expended it all in further developing his property. It is not known in the history of mining that there ever was a mine worked which would pay a profit or even the expenses of working, if its owners had to depend upon shipping the ore hundreds of miles to have it reduced.

The Victor Mine.

Owned by Cox & Matile, is the first south extension of the Paradise Valley mine, and, as far as the owners have been able with their limited means to develop it, it proves to be as good as the Paradise itself, which is now and has been paying a dividend monthly for several months past. The Victor is open to a depth of about 80 or 100 feet and shows a ledge from two and a half to three feet in width, and I venture to say that the whole vein would mill \$40 per ton—some of the ore assaying high up in the hundreds—but what can a man do with ore of that kind without a mill of his own? Nothing of course; but the poor owners must toil on some times working for wages in order to procure means to further develop their property, and awaiting for some one who has means to purchase their mines at a reasonable figure.

The Julia.

Owned by Messrs. Carrol, Patterson & Heatherton, is a very fine prospect. These gentlemen have just begun to open their mine with a force of only two men and it is a very common thing to see assays from it as high as \$800; but as a matter of fact, they have not encountered any great body of such ore, or they would be able to realize well by shipping it abroad. These are the only claims on which there is any work being done, except the Paradise company, and why it is that mining men of means do not take hold of such property is a mystery.

ANOTHER ORE CONCENTRATOR.—The Amador *Ledger* gives the following description of a new concentrator which has been invented by Judge Theron Reed of Jackson. The machine has been attached to the one stamp mill of the St. Julian, at Middle Bar, and practically tested with results so satisfactory as to leave no room to doubt its success. It consists of an endless revolving belt similar to the Frue, the belt being made of canvas. Instead of a flat surface, the belt is concave, the depression being two or three inches near the centre. The motion resembles that of a miner's pan in panning out—the most effective motion for settling gold or sulphurets. On reaching the point of greatest depression the sulphurets are concentrated at the bottom, the water and sand are discharged at the side, whilst the slowly revolving belt draws the sulphurets over the other end, where they fall of their own weight or are washed off in passing through water underneath. Attached to the machine is what is called a cut-off. This is simply a sluice-box provided with a shake like the belt. The discharge from the battery first passes through this box. At the end is a slot, the opening being sufficient to admit only from one-half to two-thirds of the pulp. By the time the pulp reaches this slot the sulphurets are at the bottom, and pass through the opening to the concentrator proper; whilst a large proportion of the lighter stuff passes over, and is finally disposed of. In this way the bulk to be treated by the concentrator is very materially reduced at the outset. Mr. Reed has spent five months in bringing the invention to its present stage of perfection. He has applied for a caveat which will give him one year in which to make improvements. The distinct features are the cut-off, the pan-like motion, the concave shape, and the side discharge. It is simple yet durable, and constructed almost exclusively of wood.

Advance in Powder.

The various acid works companies of the city and the various powder companies engaged in the manufacture of dynamite and nitro glycerine descriptions, have been trying to unite on some basis satisfactory to all for sometime. A verbal understanding was arrived at sometime ago. Since then the necessary papers have been prepared, and each interest has signed the agreement. The last signature was obtained from the Vigorit Company at noon, to-day. The parties to the contract include six acid works, embracing the Golden Gate and Western Mineral, and the following Powder Companies: Giant, California, (Hercules), Safety Nitro, Vulcan and Vigorit. The contract is for three years and is of ironclad construction. The basis first fixes on the cost of production, and the difference between uniform figures agreed upon and the selling price is to be turned into a common pool and divided up pro rata. The uniform selling prices agreed upon are about 25c for No. 2 and about 37½c for No. 1. These figures are nearly 50 per cent above the average prices at which these descriptions have been selling for of late in this market. The combination will of course place the companies in a better position than they have been for sometime. Something of the kind appeared to be absolutely needed to prevent an illustration of the Darwinian theory of the survival of the fittest. It is said that Eastern powder companies long ago resolved to similar measures. The Atlantic Dynamite, owned here, makes no powder here, does not import any, and is not a party to the contract. The Giant paid monthly dividends of 75c per share up to last March, when it dropped to 40c. It is thought the 75c rate will be restored next month. The California pays \$1 and will probably make no change. The Safety Nitro has never paid, but under the present arrangement expects to pay 25c per share next October. The Vulcan suspended dividends a long time ago, and has since levied two or more assessments. The Vigorit is paying 10c, and may increase to 15c, though it will cease manufacturing for the present, but will share in the common pool. Its present supply of materials will be sold for account of stockholders. *S. P. Bulletin, June 12th.*

BUTTE COPPER PRODUCT. A New York correspondent of the Butte (Montana) *Inter Mountain* says: There is still a bad feeling in consequence of the recent failures here and the crash; people finally begin to think that there were existing and still exist, just as many rotten concerns in the banking business and stocks, as there were wildcat mining schemes. Investors may more easily be induced to buy good mining properties where they can see something and control the same, and get for their heavy outlay of money fair returns, instead of investing in railroad shares subject to a game worse than poker, and in the hands of trustees using up other people's money for their fool gambling. The copper consumption in Europe was so far in excess of the imports from this and other countries, that a very large reduction in copper prices ought not to be feared any more. Chili bars may yet decline three or five points, but without causing any panic in Europe. It is not likely that below £50 for Chili will be touched. At the present freight rates from Butte, copper mining will pay even at such as £50 for Chili. All that smelters in Butte need is cheaper fuel. Wages for miners are not too high, though outside labor should be lower. There is no comparison between outside labor and miners' labor; the latter is dangerous, risk of life is incurred, and one dollar difference per day should be the least discrimination.

LOVELOCK NOTES.—A correspondent of the *Silver State* says: Last Monday G. W. Bothwell came in from Bernice. He informs us that he has leased the quartz mill to Messrs. Williams & Wallace, who are the principal mine owners of that place, for the period of one year. Those gentlemen will commence crushing ore about the 1st of July. This arrangement virtually settles all disputes between the mill and mine owners of that district, and puts the management of the mill affairs into the hands of the latter. This consummation of the unsettled matters of the past is hailed with a feeling of satisfaction by all concerned in the prosperity of the camp. George Lovelock received an advance of \$1,200 from San Francisco parties on the 15 tons of cobalt and nickel ores he shipped to that place, which is estimated to be but one-third of its value. The ore has been re-shipped to Swansea, Wales, to be worked, and as soon as full returns are given, regular shipments will be made. Mr. Lovelock has a six-foot vein of the same kind.

CLOUDBURSTS in the Humboldt range of mountains have deluged the valley for miles. The Central Pacific has been delayed several hours, the track being washed out in several places between Mills City and Lovelock's, Nev.

GENERAL ORDERS have been issued from the Adjutant-General's office at Sacramento, directing the brigade commander of the N. G. C. to provide for a parade of the State troops on the anniversary of the national independence.

MAJ. BRISBANE, in command of a detachment of troops marching from Montana to Idaho, crossed the main range of the Rockies the 3d of June, and reports the snow several feet deep and the weather still very cold.

USEFUL INFORMATION.

Artificial Glue.

The *Industrial Gazette*, of St. Louis, has seen and carefully examined a small parcel of what is called "artificial glue." The editor says in regard to it:

We have taken some pains to obtain from reliable sources the *modus operandi* of its manufacture. Upon the strength of what we learned, together with a knowledge of its constituents, we made a sample, and it looks and acts precisely like the original. We hope to have some more of the latter in a short time, and will compare the adhesive and other properties, which, if satisfactory to us, we will then compare with ordinary glue and give the results in these columns.

The process consists of dissolving calcic chloride in twice its weight of hot water; the solution is allowed to settle. The clear liquor has a gravity of 30 to 32 B. A mixture is then prepared of caustic potash and soda, 29 to 30° K.—equal quantities of each; a little resin added, and the whole is brought to a boil. The quantity depends upon the degree of consistency required or desired. A mixture of 60 parts solution of prepared tartar - 6 per cent; 127.5 parts H₂SO₄—sulphuric acid (10 B.); 10.5 parts sulphate of alumina (9 B.) is prepared, which will show about 8 B. Then 50 kilos of the calcic chloride solution is placed in a vessel, adding, while constantly stirring, 25 kilos potato starch, previously mixed with 25 kilos distilled water. Then 5 kilos of the above alkaline solution are added and the mass heated, until the mixture has a temperature of 167.5 Fahr.; subsequently, 4 kilos prepared tartar dissolved in 40 kilos of water; 1 kilo of chloride of zinc in 10 kilos of water, and finally, 200 grammes phenolic acid, with 30 grammes nitrobenzene, dissolved in 4 kilos of hot water, are mixed in, stirring constantly.

If the mixture is intended for vegetable fiber or dressing purposes, the resin is omitted. For dressing soft goods less soda than potash is taken.

It has been said that all the products of the cow—her milk, butter, cheese, bones, horns, hide, meat, etc.—have been counterfeited, but that nothing has been found that will pass muster for glue. Now that this new substance is being manufactured and introduced, the old brute cow must give up her glue. Although this glue was originally intended for a bleaching glue, still it is being recommended for joining wood and other substances for which glue is used, but, as before stated, we have grave doubts regarding its efficacy for wood manufacturing purposes. To our positive knowledge, however, the compound is being purchased by an extensive glue manufacturer. As he makes glue to sell, he cannot need it for his own use. Hence there is a possibility that some small portion of a lately purchased car-load may find its way to the packages containing animal glue and nothing else. We have been investigating the substance for some time, and shall continue giving reports of this and other tests as results are reached.

Something New in Photography.

A gentleman recently arrived in New York from London is reported to have brought over some samples of a new and exceedingly curious process of photographing upon marble, by which the picture is made to penetrate the solid block and appear upon the reverse side as well. It is not only on the marble, but in the marble and through it, and cannot be eliminated from it. You may grind on it all day with pumice stone, and you cannot hurt it. So long as even a shaving is left the portrait remains unharmed. Split it up with a saw, and every slice is two portraits.

The gentleman in describing the new process says: "There are secrets connected with it that I could not pry into, but I saw the greater part of the work done in making this picture. The portrait is painted on one side of the marble, whether in oil or not I do not know. When dry, the slab is placed flat on a little car and rolled into an air tight oven of moderate temperature. Under the ear is an open tray full of water, which is heated slowly by gas. After being subjected for some time to a slow steaming process, the slab is suddenly transferred to another oven with a temperature of 300 degrees and kept there till the process is completed, when removed the colors are found to have penetrated the marble, and the picture appears on the other side. I have seen billiard balls subjected to the same process, hundreds of them at a time and beautifully colored. One of them sawed in half showed the same color all through. Handsome chess and checker boards are made in the same way. In fact, a great variety of beautiful and durable work may be done. Wood may be similarly treated. Some will probably be sent to this country at an early day."

TO COLOR SOLDIER YELLOW.—According to a French journal, the soldered places can be colored yellow by wetting them with a strong solution of vitriol of copper in water, and then touching the wet places with the end of an iron or steel wire. Another process to color yellow the soldered parts is to wet it with a liquid composed of one part solution of vitriol of zinc and two parts solution of vitriol of copper, the

place being subsequently rubbed with a piece of zinc, which will cause it to assume a copper-colored appearance, which will take a fine polish. Gold-plated articles thus soldered can be plated again, when the soldering cannot be detected, or the soldered part can be wet with gum arabic water, and when dry polished with bronze powder. Silver-plated articles are to be polished with silver powder.

THE LATEST INVENTION, in the way of office furniture is a stamp with a clock attachment, the hour hand of which is simply a raised point upon a moving circle. The minute hand is an arrow on another revolving circle. An inked tape passes over these indicators and the outer circle of the hour figures. Beside the clock face is a cylinder with several faces, each bearing a word, such as "approved," "wired," "delivered," "answered," etc. Thus when a business man sends a letter, telegram, or receives an order, or transacts any business, he can by the use of this stamp record the precise moment at which the thing was done.

WHITE CLAY FOR BOILER LAGGING.—A correspondent of the *American Machinist* says that the white clay or kaolin found in many parts of the South is used for boiler lagging with excellent results. He says: "I have seen locomotives covered with it placed in the house at 10 P. M., with 130 pounds of steam, and without fire, which showed 60 pounds of steam the next day at noon." The clay is mixed half and half with plaster of paris with jute to hold it in place.

GLASS BRIDGES.—It is said that glass is gradually beginning to take the place of wood and iron in the construction of bridges in England. The inventor makes blocks of glass which he hardens by a special process. In solidity it is said to leave nothing to be desired. The experiments already made have given surprising results, and the cost is below that of bridges of wood or iron. Moreover the glass cannot be injured by insects like wood, nor rusted like iron.

TO PREVENT HAY STACKS FROM FIRING scatter a few handfuls of common salt between each layer. The salt, by absorbing the humidity of the hay, not only prevents its fermentation and consequent heating, but it also adds a salty taste to this forage which all cattle like; besides, it stimulates the appetite and assists their digestion, and so preserves them from any diseases.

GOOD MEALTH.

Eating at Night.

Popularly eating at night is thought injurious, but unless dinner or supper have been late, or the stomach disordered, it is harmless and beneficial—i. e., if one be hungry. Four or five hours having elapsed since the last meal, invalids and the delicate should always eat at bedtime. This seems heretical, but it is not. Food of simple kind will induce sleep. Animals after eating instinctively sleep. Human beings become drowsy after a full meal. Why? Because blood is solicited toward the stomach to supply the juices needed in digestion. Hence the brain receives less blood than during fasting, becomes pale, and the powers become dormant. Sleep therefore ensues. This is physiological. The sinking sensation in sleeplessness is a call for food. Wakefulness often is merely a symptom of hunger. Gratify the desire and you fall asleep.

The writer recently was called at two a. m. to a lady who assured him that she was dying. The body was warm, the heart doing honest work. To her indignation he ordered buttered bread (hot milk or tea were better) to be eaten at once. Obeying, the moribund lady was soon surprised by a return of life and desire to sleep. The feeble will be stronger at dawn if they eat on going to bed. Fourteen hours lie between supper and breakfast. By that time the fuel of the body has become expended. Consequently the morning toilet fatigues many. Let such eat at bedtime and take a glass of warm milk or beef tea before rising. Increased vigor will result. "But the stomach must rest." True. Yet when hungry we should eat. Does the infant stomach rest as long as the adult's? The latter eats less often merely because his food requires more time for digestion. Seldom can one remain awake until half-past ten or eleven in the evening without hunger. Satisfy it and sleep will be sound. During the night give wakeful children food. Sleep will follow. The sick should invariably eat during the night. This is imperative. All night the delicate and children may take warm milk, beef-tea or oatmeal gruel. Vigorous adults may also eat bread and milk, cold beef, mutton, chicken and bread, raw oysters, all of course in moderation. Do not eat if not hungry. Eat if you are.—*Boston Physician.*

FRESH PAINT.—The current belief among householders, the smell of fresh lead paint is noxious, is founded on pretty general experience but is supposed by the opinion equally current among chemists, that lead compounds are not volatile. A fact recently brought to the notice of our excellent contemporary, the *Lancet*, supports the domestic theory. The basis of the useful and

popular luminous paint is known to be sulphide of calcium. Now, this compound, when unprotected by varnish, glass, or some other impervious substance, is slowly acted on by the acids of the air, and sulphureted hydrogen is evolved, which blackens lead paint. This is well known, and can easily be avoided by proper protection of the paint. But the curious thing is that unprotected luminous paint is found to be perceptibly blackened by the fumes from fresh lead paint. There seems to be only one possible explanation of this; namely, that a surface freshly covered with lead paint does actually emit some volatile compound of lead. We believe that many physicians could confirm this view from their own observations in regard to newly painted houses.

TELEPHONES AND IMPROVED HEARING.—It appears, says the *New Haven Register*, that many people who have telephones in their houses or places of business, and use them frequently, find their hearing bettered. The best testimony, however, comes from the central office: At each switch-board sits an operator, generally a girl, who, from morning till night haggles with unreasonable subscribers till her head fairly rings with "hello," "all right," "go ahead." Now her ear is drilled to catch the faintest sound. If an operator were to take a switch-board one day in the week, only, and do all the work required on that day the practice would doubtless be detrimental, because it would be exhaustive to both the muscular and nervous make-up of the ear. Systematic use of the telephone seems to develop the hearing above its normal acuteness. The difficulty which people find in working the telephone comes from inability to fix the attention on what is heard.

GREAT STRENGTH OF THE ANCIENTS.—Physical superiority of the ante-Alexandrian Greeks to the hardiest and most robust nations of modern times, is perhaps best illustrated by the military statistics of Xenophon. According to the author of the "Anabasis," the complete accoutrements of the Spartan soldier, in what we would call heavy marching order, weighed seventy-five pounds, exclusive of the camp, mining, and bridge-building tools, and the rations of bread and dried fruit which were issued in weekly instalments and increased the burden of the infantry soldier to ninety, ninety-five, or even to a fully hundred pounds. This load was often carried at the rate of four miles an hour for twelve hours per diem, day after day; and only in the burning deserts of southern Syria the commander of the Grecian auxiliaries thought it prudent to shorten the usual length of a day's march.

LINIMENT FOR RHEUMATISM.—A patented, and what is said to be a most excellent liniment for inflammatory rheumatism is given as follows:—The proportions being known only to the patentee: Alcohol, pure cider vinegar, kerosene oil, spirits of turpentine, ground Cayenne pepper, ground French mustard, flowers of sulphur, ground ginger and carbolic acid. These ingredients are mixed cold and thoroughly mixed by agitation and stand twenty-four hours, when it is ready for use. In use the composition is applied externally to the part of the person affected, and the operation repeated every few hours. The same liniment is also pronounced good for sprains, bruises, weakness in the back or side, etc.

CONCENTRATED OXYGEN.—The curious statement is made by a writer in the London daily *News*, who has been collecting some particulars regarding diving operations on the Thames and elsewhere, that men have grown old in this particular business; though in early life they had been in danger of consumption. The theory is a simple one. Men under water in a diving dress breathe a condensed atmosphere, and are therefore inhaling oxygen in a concentrated form; and this, it is assumed, is conducive to the cure of consumption.

PALPITATION OF THE HEART.—A French physician says that distressing or excessive palpitation of the heart can always be arrested by bending the body double, the head down and the arms hanging, so as to produce a temporary congestion of the upper portion of the body. In nearly every instance of nervous palpitation the heart resumes its natural function. If the movements of respirations are arrested during this action, the effect is still more sure and rapid.

POISONOUS COLORING IN COFFEE.—It appears from the recent investigations of the New York City Board of Health that both arsenic and lead have been found in raw coffee, which had been put through some process to improve its color. Other deleterious substances are also used in coloring coffee. Their use was promptly stopped by order of the Board.

TREATMENT OF EARACHE.—It is said by the *Medical Record* that by following the simple method here given almost instant relief of earache is afforded: Put five drops of chloroform on a little cotton in the bowl of a clay pipe, then blow the vapor through the stem into the aching ear.

OIL OF WINTERGREEN mixed with an equal quantity of olive oil is recommended as a rheumatic painkiller.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

TUNNEL.—Amador Ledger, June 14: The contract for the first 1,000 ft of the big tunnel at Middle Bar was finished last week. The work is at present being prosecuted by day labor. The header is in slate. Bids are called for sinking the Mahoney shaft 100 ft deeper. It is gratifying to be able to state that good ore has been struck in the new shaft of the Lincoln mine, which has been leased by S. D. R. Stewart. How large the ore body is we have not heard, but from the fact that 20 stamps of the Lincoln mill are being put in readiness to commence crushing, we should judge that it is of considerable size. No man in Sutter creek deserves success more than Mr. Stewart, for no one has been more enterprising and persistent in the development of the mineral resources of that neighborhood than he.

Calaveras.

MILL.—The work of erecting a 10-stamp mill on the Marshall mine is being rapidly prosecuted. Mr. J. Rider, of this town, one of the best mill-wrights in the State, is employed to superintend the work. The Marshall is a rich mine, and when the mill gets to work, we may look for big returns.

El Dorado.

GRIZZLY FLAT MINES.—*Republican*, June 12: A recent visit to Grizzly Flat and some inspection of the mines in the vicinity has convinced us that no better opportunity for the investment of capital in the mining industries can be found on this coast. There is an abundance of gold-bearing quartz, and excellent natural facilities for working it. The whole of this mining district is overgrown by pine and oak, and the swift streams of the Middle and North Fork of the Cosumnes river can be made to furnish water-power. Many of these rich ledges are small and variable at the surface, and this fact has to some extent discouraged prospectors. Considerable prospecting has been done from an early day, but the work has usually been done in a desultory way by men of limited means, unable to prosecute the search to any considerable depth. Scarcely a mine in the whole district, save the Mt. Pleasant, has had a fair opportunity to demonstrate either its worth or its worthlessness. The district needs capitalists who are able to sink 500 ft on these ledges without pausing ten years at a time to take breath. The history of the Mt. Pleasant mine indicates what may be done by men of wealth and energy. The formation of this mine at the surface was not more flattering than that now possessed by other mines in the same locality. It was worked in a desultory manner for years without being considered, and finally sold to the present owners, who, by the management of Capt. Smith, the Supt., have developed it into one of the best little mines on the coast. The shaft has reached a depth of 630 ft and below the 500 level there is a body of paying ore that reaches a width of seven ft and that will furnish profitable work for at least two years without going any deeper. The very appearance of the mill indicates prosperity. Everything is built permanently and during the last 15 months the company has introduced eight Frue Concentrators to be used in saving the sulphurets that form a valuable part of the ore.

INDIAN DIGGINGS.—*Cor. Amador Ledger*: The Edger mines at Mendon are the best paying mines in this neighborhood at present. They are worked by means of drift and hydraulic power. The Baughman and Hale mine at Indian Diggings is being worked day and night. The Spring gulch mine, situated half a mile north from Indian Diggings, owned by Chas. Estey, G. S. Estey and W. McClary of Olea, is being opened up by means of a hydroc tunnel. Gravel has just been struck which prospects well, and the main channel will soon be reached, when it is expected to be one of the best paying gravel mines in this vicinity. The Ball mine has ceased to pay as it once did, but the brothers are prospecting in the vicinity. The Crystal quartz mine near Mendon or Brownville is said to be paying handsomely. These are the only mines worthy of mention in this locality, all of which do not employ over 40 hands. For the benefit of Amador prospectors who occasionally wander into this locality on a prospecting tour, I will say that there is now but little chance for finding good mines, for nearly all the ground is located. I do not wish to discourage the army of prospectors who might venture into our camp, nor do I wish to encourage it when I know that this part offers no encouragement to that kind of immigration. Indian Diggings is situated on the south side of a large mountain range, and commands a sublime view of the far-reaching mountains and forests; has a good climate, with excellent water. One of my contemporaries, in writing to the *El Dorado Democrat*, says this is one of the most favorable places in the country for prospecting; that the mines are all paying; and that there are hundreds of acres of good favorable ground open to prospectors. To all such reports I would say give no heed. Men of money and means come upon the strength of such reports and go away disgusted and discouraged. The sulphurets are hauled to refining works in Amador county at an expense for freight that must give an idea of their richness. The mill has twenty stamps, and it seems strangely out of place among the tall pines that grow closely about it. The Melton mine, now under the management of H. H. McClellan, promises to equal the Mt. Pleasant in the near future. It is on the south side of the North Fork of the Cosumnes, two miles north of Grizzly Flat. The ledge extends approximately north and south, and varies in width from two to four ft. A 15-stamp mill has been built on the edge of the river where the ledge crosses, and water power is furnished by a ditch two miles long, which takes free water from the stream. About a half-mile south of the mill a shaft has been sunk 186 ft, from which paying ore is now being hauled to the mill. The works that promise the greatest returns, however, are on the steep hillside south of the river and the mill. This hill has an altitude of about 500 ft, and on the face of it are four tunnels tapping the quartz at various depths. The ledge is similar to the Mt. Pleasant, and improves as depth is reached. All the necessary preparations for handling the quartz and conveying it to the mill are completed, and the

abundant wood and water power added to facilities for extracting the ore and draining the mine through tunnels, insure unusual economy in milling. An air compressor has just been purchased, and in a few weeks a National drill will be set to work in the fourth tunnel, and another in the new tunnel from the mill as soon as a face of solid rock is obtained. At the time of our visit five stamps in the mill were crushing twenty tons of rock from a mine partially owned by A. A. Gignac. Favorable returns were indicated.

GRAND VICTORY.—*Mountain Democrat*, June 11: This mine, located near Diamond springs, has always produced low grade ore, but under the management of Supt. C. A. D. Gray with a mill of fifty stamps, it has been made to pay. Mr. Gray is not the man to operate a mine for fun, and the report got out some two weeks ago that the receipts did not cover the expenses, when it was said on our streets that work would be suspended. We are assured this is a mistake. Forty stamps are kept hammering away, and the plates indicate a better quality of ore than has been crushed for months.

NEW MILL.—The owners of the Alhambra mine, Kelsey township, from which over \$20,000 has been taken out, the mill in use being a mortar, have determined to erect a mill at once and proceed to thoroughly develop the property. R. H. Redd will continue to direct the work, while Ballard and Weatherax will look on and hope, as every miner who has examined believes that the deeper they go the better it will pay.

Mono.

STARTING UP.—*Homer Index*, June 16: The Gorilla will start up full handed to-day. The tramway has been cleared of snow, put in thorough repair and a new cable added to the upper section. The company's reduction works are still running on ore left over when work was suspended last winter, a goodly quantity of which is still on hand. The new Planet mill arrived on Tuesday last, and is being put in position at the reduction works. The May Lundy is now running full handed, the tramway, teams and mill having been started up on Thursday. Work will not be commenced on the Lake View till the additional five stamps are in position. The Bryant mine is yielding some very fine ore from the 130 level, and arrangements are being made to get the ore down to the Butterfield mill. Reports from the Great Sierra tunnel in Tioga district continue very favorable. The rock is still soft, and is filled with seams of quartz.

BODIE.—*Free Press*, June 16: The Standard is still running 15 stamps in the Standard-Bulwer mill, and is expected to clean up at least \$8,000 to-day. This is certainly a good showing for the number of stamps employed during the past week. Two sets of sluice are now in operation below the Bodie tunnel mill, one of which will do remarkably well according to tests made.

BODIE CON.—During the past week there was 546 tons of ore crushed at the mills. The average assay value of the pulp is \$22, and of the tailings \$2. The pulp assay is no test of the value of the ore. The only way to get at the value of the ore is at the weekly cleanup. See the number of tons crushed and the amount of bullion shipped; this is the true test of the value of the ore. North drift from upraise No. 4 is in 67 ft. South drift from upraise No. 1 is in 26 ft. North drift from winze No. 2, 306 level, is in 38 ft. There is no change in the ore-breasts since last report.

STANDARD CON.—Since resuming operations we have extracted and shipped to the mill 654 tons of ore; received 720 ounces of crude bullion, and shipped to the company this day \$5,845 74. South drift No. 4 from east crosscut No. 2 has been extended during the week 10 ft, and is now in 146 ft. The vein in the face is 2 ft wide.

BULWER CON.—The south drift from west crosscut No. 2, 500 level, is in 284 ft; progress during the week 11 ft. Vein about 15 inches wide.

BODIE TUNNEL.—The north drift on the vein, 200 level, was advanced 20 ft. The vein in the face is improving, while the rock breaks about the same.

Plumas.

GREEN MOUNTAIN.—*Bulletin*, June 11: Fine progress is being made in the main raise in the Blake chimney. It is now nearly 400 ft from the No. 6 tunnel, and is advancing at the rate of about 35 ft per week. With no unforeseen delay, connection will doubtless be made with the No. 5 level in about ten days. Raise No. 2 is 68 ft east of the main raise and is now about 125 ft up, and is in good quartz. The Blake chimney is being opened by three blind drifts which are respectively 84, 181 and 285 ft from the No. 6 tunnel. Connection has been made in No. 1 blind drift east with No. 2 raise and stope are being started and ore chutes put in at this point. Work has been discontinued on No. 6 tunnel west, on account of air, but as soon as the raise is through to No. 5 level, the drills will be started again and work prosecuted vigorously until the sulphuret chimney is reached, a distance of nearly 300 ft from the present face. At present the Co. are running only 3 stamps, which are being supplied with ore from the two raises and the blind drifts; but the 60 stamps will all be in operation in two weeks more, and the mine will be in shape for a long and profitable run. The mining outlook for this section of the country is much better than it has been for some time. Few of our ledges in this part of the state have been sunk on to any depth. Hitherto the miners have been digging in the grass roots, so to speak. The work on the Green Mountain mine has demonstrated the correctness of the theory that our ledges improve with depth. That mine is looking better than for years before. There is no reason to doubt that the Crescent mine has thousands treasured in its ledges at no great depth. All that is required to make an excellent property of it is to get it out of the legal entanglements that now hamper it, and expend a little capital wisely in its development. The Sun Set is running smoothly, and the ledge in the drift has widened out and is prospecting well. In the east and west end of the Firststone stope, the ledge maintains a uniform width of four ft, with a decided improvement in the quality of the ore, some parts of the ledge showing free gold. Miller & Leck are hunting for a rich pocket in the "Miller" claim, formerly known as the Pulsifer mine. This claim has yielded well during the spring, two rich pockets having been discovered and worked out. Firststone & McGraw are hauling quartz from their mine on Washington Flat, to the Crescent mill, which has

been leased by them for a short time. A good clean up is expected from a short run.

WILL MAKE A TEST.—*Plumas National*, June 14: We are informed that ten tons of Lucky S. rock will soon be brought from the mine and crushed in the Premium mill, near the Blood Ranch. If the test proves satisfactory the Company will put up a mill on the mine at once, and as the rock prospects well there is very little doubt but that it will prove good.

HALLSTED MINE.—Messrs. James and Hosking returned from the East Branch on Saturday, having made their inspection of the Hallsted mine. Mr. James informed us that the East drift from the tunnel looks very favorably, but the air is so bad that the men could not work in it, and no developments had been made there for several weeks. The West drift is not looking so well, the rock being so hard and gray. The Company only had until the 1st of July to finish their prospecting work, and as it would take some three weeks to make arrangements for a supply of good air, they concluded to stop work. The owners were not disposed to extend the time for prospecting. Mr. James speaks highly of the appearance of the ledge in the East tunnel, and intimates that there are strong probabilities of a permanent and rich mines but did not consider the developments sufficient, as yet, to warrant the purchase by the Company.

San Bernardino.

DAGGETT SAMPLING WORKS.—*Calico Print*, June 14: These works were opened for business on Thursday of last week, and the results of the first week's run, as we learn from L. F. Olmsted, the manager, have been highly satisfactory. Seventy tons of ore have been crushed, sampled and paid for, and more is arriving daily. Mr. Olmsted has paid out nearly \$6,000 already, and is shipping earloads of very desirable ore to the smelters East and West. The first car averaged over 400 ounces silver per ton. The general average sampled is 167 ounces per ton. As far as we can learn our miners are highly pleased with the new mill and its methods of transacting business. Many parties have lately outfitted here to start work on galena and copper mines in this vicinity, that have laid idle for want of a market. Several lots of such ore have been milled with very satisfactory results. Our merchants and business men should awake to the situation, and be prepared to meet the demands of the trade that will center here for 150 miles around. A bank should be started here at once, for a business of \$100,000 monthly requires it. These are solid facts, as solid as the ponderous silver bars that are daily dumped into our Express office.

Sierra.

GOLD BLUFF.—*Mountain Messenger*, June 7: Mr. Van Slyke has seven men employed at the Gold Bluff mine. He has abandoned the upper workings and is running the lower tunnel night and day, doing now in very good working rock. The tunnel is in 500 ft. He has rigged a water-blast in which he takes much pride, as it is his own engineering. One thousand feet further will bring him to the ledge and give him 300 ft backing. He has unbounded faith in the mine. P. A. Jamping came down from Hog Canyon Tuesday, and reported that he had pushed his tunnel through hard blasting formation into soft picking rock, with every indication of being very close to the ledge in the Good Hope claim, supposed to be very rich, where the Primrose obtained such good pay. Snow is four feet deep and melting fast. An extensive slide occurred in the Last Chance claim, at Howland Flat, last week, which came near being a last chance, indeed for several white men and a whole gang of Chinese. Without any warning the bank slid from the pipeclay, catching six men, but they were rescued alive. There were several narrow escapes. A very rich quartz discovery is reported from the neighborhood of Chips Hill, near the root gravel claim. The quartz is said to be rich in silver as well as gold. The twenty additional stamps now being added to No. 9 quartz mill at Sierra City, are expected to be running by the 1st of July. We learn that the root claim on Chips Hill, is getting a good prospect again—better than for a long time past. The gross yield of the Bald Mt. Extension Mine for April is \$5,049 60; Pay Roll, \$4,395 62.

PROGRESS.—*Mountain Messenger*, June 14: The rock in the Red Oak tunnel is not so hard now as it has been, and more rapid progress is being made. The chances are favorable for the tapping of a rich gravel lead at an early day.

NEVADA.

Washoe District.

ALTA.—*Enterprise*, June 14: Good headway is making in the west drift on the 2150 level, though the rock is hard. The diamond drill has not been started east from the face of the east drift on the 2150 level, and will not be until the ground to the westward has been explored. It is very probably that when the water to the eastward is tapped it will require a considerable length of time to drain out. It is known that this east body of water extends upward to the level above, and very likely portions of it reach still higher in breaks and crevices in the rock.

UNION CON.—There is as yet no noteworthy change in the material encountered in the east crosscut No. 4 on the 3100 level. There is a considerable amount of water flowing from the drift, but the quantity is not sufficient to materially interfere with the operations of the workmen. The ground to the eastward of the main north and south drift is also draining off through two or three diamond drill holes.

BEST AND BELCHER.—The east crosscut on the 1200 level is still encountering a considerable amount of quartz. It is being advanced into a very favorable formation. As the drifting is now wholly on the upper levels, the waste rock is being taken out through the old lower tunnel, and no hoisting is being done at the Osbiston shaft. The pumps at said shaft are kept going, however.

COMBINATION SHAFT.—Are cutting out a working station at the 2900 level and also preparing to set up the Cornish pump at this point. The pump will be in place and running in about three weeks. In about the same time the bulkhead in the Chollar on the 2600 level will be completed.

CHOLLAR.—Are preparing to place a stone bulkhead in the drift on the 2600 level, that in the Savage having been completed. This bulkhead will be completed at about the same time that the Cornish

pump will go into operation at the 2900 level on the Combination shaft.

YELLOW JACKET.—The prospecting drifts are still finding ore in addition to that already opened up, therefore the mills are likely to be kept busy during the whole season.

MEXICAN.—The winze started on the 3100 level has been sunk to a point 10 ft below the 3200 level, where a station is now being cut out.

HALE AND NORCROSS.—Are shipping ore to the Mexican mill, on the Carson river. About 700 tons have already accumulated at said mill, where a crushing of 1,000 tons will soon be made.

CON. VIRGINIA.—The east drift on the 2900 level has been advanced about 30 ft. Have completed repairing the C. and C. joint shaft. Have also completed a cooling-off house for the use of the miners working in the heated drift.

ANDES.—A considerable amount of prospecting is being done. A great deal of quartz of a fine appearance is being encountered and some spots of ore that will pay for milling are occasionally met with.

GOULD AND CURRY.—Good headway is making in the two crosscuts that are being run to the east on the 1200 level. The material is a favorable formation, consisting of a mixture of quartz, clay and porphyry.

SIERRA NEVADA.—The north drift on the 3100 level is making good headway in vein material of a favorable character. Thus far very little water has been encountered in the drift.

IMPERIAL.—The lateral drift, now in Alpha ground, is encountering a considerable amount of quartz, but thus far it is not found to carry metal in paying quantities.

BELCHER.—About the usual amount of low grade ore is being extracted on the old upper levels, which is being shipped to mills on the Carson river.

UTAH.—The southeast drift on the 1050 level has been extended 33 ft; total length, 178 ft. It continues in a favorable vein formation.

CROWN POINT.—About the usual amount of low-grade ore is being extracted and sent to the mills on the Carson river.

UNION SHAFT.—Repairs are still being made to the drain drift connecting with the Sutor tunnel on the 1600 level.

OMIR.—Are sorting out fillings in the various drifts on the 250 level.

Bald Mountain District.

PLACER AND OTHER MINES.—*Enterprise Sentinel*, June 12: Judge Adams and Andy Swick came in from Bald Mountain yesterday and report favorably of that district. Not only are there well defined gold quartz veins being developed there, but gravel placers have been traced through the gulch for a distance of three miles, and operations are now being inaugurated in them. Andy Swick, Dick Robinson and two other men started in lately to sluice the gravel, and got down about five ft. They worked for about three hours, and got three dollars. They think that when they get properly fixed for work they can make from five to ten dollars per day to the man, as long as water lasts. They have at present about 60 inches of water running through the gulch, and have come in after lumber and other material to make sluice boxes with. The gold is heavy, bright and in small particles, of the consistency of sand up to the size of a grain of wheat. The pay gravel is in the bottom of the gulch and on part of the hill sides. In no place has a greater depth than five ft been attained. Bedrock has not yet been touched, but the gravel gets richer with depth as far as they have sunk in it. They are now running their sluices, and will increase their facilities for working immediately, so as to take advantage of the water. No washing has ever been done before this season. It is thought that the gold comes from the quartz veins and the Tim Peak ledge. The latter Judge Adams is interested in, and from the description he gives of it it is a peculiar vein. It crops out near the top of the hill at a point about 500 ft above the gulch. It has the appearance of oxidized iron ledge matter, with rounded pebbles all through it, which seem to have washed into the ledge. Where the vein was discovered it is bent over flat, and a ledge of calc spar has forced through it in such a manner that it appears near to the surface as parts of the vein itself. The whole thing is capped over with porphyry, or rock of a nature similar to it. During the course of development it has been ascertained that the spar forms one of the walls of the vein, but whether the hanging or footwall has not yet been determined. It is intended to run a tunnel in on the ledge from the gulch to develop the mine in that way.

Columbus District.

MOUNT DIABLO.—*True Picture*, June 7: The east intermediate from winze No. 5 shows some \$60 ore that looks very encouraging, and the west drift from the same winze shows a narrow streak of good ore. This drift has been advanced 8 ft during the week. Winze No. 6 is now down 111 ft, and work has been stopped on the same. The fourth level is being driven west to connect with this winze. In the intermediate, between the second and third levels and west of the shaft, the west drift is in 46 ft and shows a strong ledge of low grade ore. The raise from the east drift on the first level shows a little ore of fair grade. The incline is now timbered from the fourth level to the chute on the third level, and hoisting will begin from the same in a short time. As there is a great deal of waste to hoist it will take some time before sinking is resumed.

COLUMBUS CON.—Crosscut No. 3 from the main drift on the 150-foot level was extended 5 ft during the week, and is now about 53 ft in length. Near the face of the crosscut a two-foot vein of good ore was encountered that promises well. The average grade of the ore in the streak is \$92, and drifting on the same will be commenced in a few days. The upraise on the ore in the south crosscut from the same level is now up a distance of 30 ft, and is about 15 ft in width at the top. The width of the streak of ore is about the same as last reported, and the grade is \$40 per ton. No work is being done except on this level, but it is expected that general work in the mine will be resumed at an early day.

Cortez District.

VALUABLE MINE.—*Reese River Revue*, June 17: Away back in 1863 Andrew Vetch discovered a mine in Cortez Mining district. Two years later Simon Wenhan bought him out and began to open it out. He had a long and discouraging time of it,

but through years of despondency and poverty he struggled on against obstacles which would have discouraged most men. He was unable to pay his men and as a consequence they quit him and he kept getting others, until finally he had only Chinamen at work. But at last success crowned his efforts, and the mine began to pay. Since then he has quietly been taking out the silver by hundreds of pounds. All his debts are paid and he is reputed to have a few dollars between him and the poorhouse. The Cortez mine is worked by a tunnel which is run into a high hill about half way up the side. The ledge is a big one, and the ore free milling. He can take it out faster than the mill now in use can work it, and is about to build a new 10-stamp mill this summer to help reduce the ore. The bricks are already being burned for it. The mine is as dry as a powder horn. In fact they have to haul all the water used at the mill and houses in wagons a distance of two miles up the hill. Originally they had to carry it six miles, but pipes have been laid to bring it within two miles. Sixty men are employed underground, and about forty on the surface. Mr. Wenban has his mine patented, so his title is perfect. The mine itself is in Eureka county, while the boarding-house and store are in Lander. It is likely that the Cortez mine is one of the best now being worked in Nevada, and Mr. Wenban is very quietly minding his own business and getting rich.

Comet District.

FAVORABLE PROSPECTS.—*Pioche Record*, June 7: Judge Clapp took a trip out to comet district during the week. He speaks very favorably of the prospects there. He states that the claim owned by Freudenthal & Co. is a very promising one.

Eureka District.

NOTES.—*Eureka Sentinel*, June 14: The Liberty mine, in New York canyon, is being worked under lease, with good prospects ahead. The Silver Connor mine keeps up its reputation, and sends from 10 to 12 tons of ore to the Richmond daily. H. K. Mitchell, one of our most indefatigable mining men, is developing some good mines in Secret canyon. The amount of custom ore being sent to the Richmond furnaces greatly exceeds that of any previous season. The bins and platforms are full, and piles of ore are distributed all over the yard. Jim Coates has located a placer claim at Bald mountain, just below that of Andy Swick & Co. He started to work last week with John Fryer, and sunk two ft in the ground. The result was good, as five cents to the pan was obtained. Jim thinks that if he can get all of such quality of pay dirt as he can shovel into the sluices it will be all that he will want to make him rich. He has come to Eureka to purchase lumber to make sluice boxes, and on his return to Bald mountain will make things hum.

Daily shipments of ore are being made by tributaries from the Hamburg mine, Peelslick hill. Martin Planton has a large quantity of ore broken down in the Dead Broke mine, but has not yet determined to what furnace he will ship for reduction. A fine prospect has been struck in the south drift, 200 level, of the Eureka tunnel. The ore is quartzite, and is much like the ore of the Addison chambers in appearance. The machinery at the Connolly mine is in fine running order. The mine looks well, and a change, still for the better, has taken place in the contractor's drift. The face is in open ground with red line on one side of the fissure. H. B. McKee has two men employed prospecting the Endeavor mine in Page canyon. They are running a drift from the north shaft to cut an east and west fissure. It is now within 20 ft of completion, and the prospects for finding ore are good.

Pinto District.

HIGH GRADE ORE.—*Eureka Sentinel*, June 14: Andrew Berryman, Tom Mellon and Richard Berryman have shipped 10 to 12 tons of high grade ore to the furnaces from Silver Nugget mine, Pinto district, during the week. They have a large quantity of low grade ore broken down, which they will hold in reserve for better terms than can be had at present. The mine is looking exceedingly well, and they have reasonable expectations of encountering large bodies of ore during the summer. John Steel is doing good work in the Diagonal mine, Maryland mountain. He has some high grade ore on the dump and is breaking more of it down.

Secret Canyon District.

PROSPECTING.—*Eureka Sentinel*, June 14: Jim Murray, with two tributaries, is prospecting the Alliance mine. A drift is being run on a quartz seam about 30 ft from the surface. The Scorpion is being worked by three men on tribute. They are at present running on a bunch of good quartz that may open out into a bonanza. Some prospecting work is also being done with chances for success in other parts of the mine.

ARIZONA.

TURKEY CREEK DISTRICT.—*Cor. Prescott Courier*, June 12: Mining is looking up in this stanch old district. The miners are all hard at work delving in the mines, or assorting and sacking ore for shipment. The old district keeps jogging on in a busy way, with an outlook brighter than a silver dollar. Most of the machinery for the Chase Co. has arrived, and the company is pushing work vigorously. The Wonder mill is going up fast. It will be the most complete gold mill in Northern Arizona, and will drop its stamps on or about the 20th of June. The A. C. M. Co.'s mill, at Buena, is being remodeled, concentrates put in and the works put in fine running order. The company will purchase and work custom ore. Mr. Whiting, late of Tip Top, an efficient mill man of much practical experience, has charge of the works. The company will commence crushing ore in two weeks, and Mr. Whiting is sanguine that he can run the mill to the satisfaction of the chloriders and with profit to the owners. The Franklin Co. has the whim up on the Union shaft, and will commence sinking and drifting immediately. Some of the best ore of the district has been taken out of this mine, so we may look for rich developments as work progresses. Morgan & Co. are assorting and sacking ore from the Pine Spring mine. The mine will start up soon. In turning down the mountain west of the Yankee Boy, McCann struck high grade ore in the Longfellow mine, 140 ft below the surface. McDonald is sinking on the Yankee Boy, and taking out very rich ore. Five tons of ore from this mine is now ready for shipment. McDonald says it will work over \$800 per ton. The Ready Pay is a very

promising prospect—samples from \$90 to \$1,115 per ton. The claim was recently purchased from Mr. Cotten. Mr. Mulvenon is sinking on the June Bug, which is a strong vein. The ore is very rich in horn silver. Mulvenon & Roach are also drifting on the Roach mine. This mine looks as well as any in the district. Keating & Co. are drifting on the Holmes (75-foot level); drifts show a fine body of ore. Kowell is sinking on the Syndicate. He is taking out very rich chloride ore and will soon make a big shipment. Mr. Howard is sinking on his claim, situated below the Brick Yard. The ore is good, and the prospect for a big mine is very promising.

BONANZA MINES.—*Quijota Prospector*: The developments during the past week have proved beyond a doubt that the ore body extends, at least, to a depth of 200 to 300 ft from the surface of the hill. The company will probably decide, very shortly, whether they will build a mill at once, or wait until connection has been made from above with the tunnels. Should the latter course be decided on, it will be several months yet ere reduction works are erected. What has been done so far, has been merely prospecting work, yet about 50 men have been employed steadily, involving an expenditure of from \$6,000 to \$7,000 monthly. Had and eastern company purchased these mines, one-tenth of that work would probably have been the result. There is sufficient ore in sight now to run a 20-stamp mill for several years, but the bonanza company are not in the habit of putting up mills until they can do so on a large scale, and have enough ore actually in sight to run them permanently. Had other companies pursued this course in the territory, Arizona would not have received so many serious setbacks in the past ten years.

MOHAVE.—*Miner*, June 14: Messrs. Roe, Elliott and Luthy, who lately leased the Paymaster mine, have already put the main shaft in order, and put in a platform above the water level. They have now a force of eight men at work stoping and drifting in the upper levels under the foremanship of Henry Elfers. The force will probably be increased very shortly. We need two or three smelters like the one at Denison in this county. Austin and five other men are grading a road up to the timber in the charcoal canon near Cerbat, for the purpose of supplying the mill with wood. The new smelter at Planet is in running order, and already ten tons of bullion have been turned out. There are over fifty men employed in and around the smelter. W. H. Hardy has eight men at work on the Infalible mine at Stockton. The new tunnel which he started a short while since is in about 120 ft, and is being driven at the rate of six to eight ft per day. Richard Hicks and James Oliver, two Cornish miners and recent acquisitions to this district, have leased the Pennsylvania mine in Todd Basin of Capt. Layne for one year, and will at once start to work on it. They have also bonded the mine for the same time for the sum of \$15,000.

THE CERBAT MILL.—Six men have been at work on the Cerbat mill for over two weeks past, putting it in perfect order. The mill started up on Thursday with about 150 tons of ore to commence on. Among the shipments already contracted for by this mill we note twenty tons from the C. O. D. mine, besides several smaller lots from the mines in the same basin, five tons of ore from Joe Labaree's claim near Stockton, with considerable second grade ore, fifteen or twenty tons from the Prosperity mine in Todd Basin, owned by Caldwell Wright and J. P. Layne, while Wm. Sherman sends a couple of tons from the southern extension of the same mine as a sample. In addition to this there are about 30 tons of ore from the Cerbat mine already at the mill, and about 50 tons at the Paymaster ready to be hauled down. Many other miners have promised to send in shipments of ore, and by next week Cerbat will present quite a lively appearance.

PECK.—*Prescott Courier*, June 14: Mr. Rowe returned home recently from Peck and other mining districts. From him we learn the following: The Buzzard and Raven mine, near the Dosoris, has 18 inches of rich galena ore, which will pay for shipment to Pueblo or any other place. McDonald has another lot of ore out of the Mark Twain mine. He ships through First National Bank, of Prescott. Dave Grubb has a great deal of rich ore at his mines on Hassayampa creek. Mr. Caigne, Supt. of the Dosoris, has, in the past month, shipped 103 tons and has about 75 tons more ready for shipment. The First National Bank ships this ore to Pueblo, Colorado. Frank Alters and co-owners of the Coschoot mine, near Copper Basin, has plenty of shipping ore, and think of sending more of it to Pueblo. A former shipment made by them paid well. Negotiations are still pending for starting Lynx creek reduction works. United Verde Co. have enough coke on hand to run their smelter a month.

THE LYNX CREEK PLACERS.—The Eastern parties having a bond on this property failing to come to time, Governor Trile, in company with the Murphy Bros., it is rumored, will hereafter operate these rich diggings. During the last winter, it is said that nearly \$20,000 in gold was taken out by the Lynx Creek Hydraulic works—the last installment of which, \$2,600, is on deposit at the Bank of Arizona. Parties in a position to know, estimate that during the last sixteen years, over \$500,000 in fine gold has been taken from this creek, in the vicinity of Prescott.

COLORADO.

SOLID EMPIRE.—*Colorado Miner*, June 14: During the past two months the *Miner* has expressed unbounded confidence in the Empire mines. For some years the old gold camp has remained idle with but few mines worked, and but small production. Yet within the camp lie still undeveloped mines, worth millions when once brought into the market as active producers. A few weeks since the *Miner* reported the purchase of property by a wealthy German company, that will during the year develop their property by thousands of feet of shafts and tunnels. They are preparing for deep mining, and will prosecute the work with vigor. Later was reported the sale for \$30,000 of the Pittsburg group, which has shown well in the past and paid largely. Yesterday we received the news of another, and the largest sale made for years in this camp. It is a bona fide sale, and the property has been transferred. Colonel John M. Dumont purchased of George G. Vivian, Samuel J. Vivian, and Herbert S. Vivian the Neath mine. The price paid was \$60,000. This insures the

future of Empire. The property, being purchased as it is by a man who never invests unless satisfied that the mines will pay, will be worked systematically and will bring Clear Creek's gold camp to the front. About four ft of snow on the level is reported in Grizzly gulch, Mr. Moore, who is leasing on the Shively mine, has been taking out good pay for some time. The lessees on the Young America, on Red Elephant, now have a fine streak of ore and are running night and day shifts. It is reported that the Snyder lease in the Baltimore tunnel is still paying well, the lessees shipping regularly and the streak increasing in richness and size. Herman Minert, who has been doing deal work on his lode on Kelso mountain, has at last much brighter prospects. After running 150 ft he has encountered nearly a foot of good ore. Messrs. Woods and Walsh, on the eighth level of the White lode, on Red Elephant, have a four inch streak of ore extending the length of 30 ft along drift. The ore mill runs 200 owners.

A TENDERFOOT STRIKE.—I understand, as they are called in Colorado, are usually looked upon as the class who do foolish work and development upon property that gives no showing of ever becoming a producer. Yet the opposite of this idea is many times the truth and the laughing-stock of the experienced miner becomes the bonanza king. A case in point is the recent rich strike made on Red Elephant mountain by C. Koontz, of Empire. Mr. Koontz has been patiently developing his property, without regard to the derision of those who said he has wasting money, and working where no mineral could possibly exist. Last week, in drifting west from the bottom of the 80 ft shaft on the Little Giant lode, he encountered a small streak of mineral that in driving six ft has widened to over eight inches. As development work proceeds the ore body continues to improve, and is beyond cavil, one of the richest and best strikes ever made in Clear Creek country. It will serve also to prove to doubters that Red Elephant is still one of the best camps in the State, and that with development every mine on the hill will prove a bonanza. Mr. Koontz says he feels that at last he has his fortune in easy grasp, and we must admit the truth of it when we remember that a millrun from the ore taken out this week gave returns of 540 ounces silver first-class 260 ounces second-class and 32 per cent lead. Development work will be pushed with vigor, and the lode will soon be a veritable Little Giant.

IDAHO.

LOST RIVER.—*Cor. Wood River Times*, June 11: Your humble servant, took the opportunity of visiting some of the promising mines of this camp. From Alder City our first direction was up Alder creek to the new saw mill being erected by Messrs. Skelton and Ashton. The mill is not running as yet, but the road is completed and the mill on the ground, and will be sawing next Monday a week. From the sawmill we went some two miles farther up the creek, to where Harry Curtis and Fred Roth are camped. Harry possesses an interest in the Black Horse, Wheel of Fortune and Homestake claims. They all show immense croppings of iron, copper, galena and carbonate, and are bound to enrich the boy. And who objects? Farther up is the celebrated Mammoth Mine, owned by Talbot, Peterson, Cannady and McGee. This property is among the oldest in the camp, and carries a continuous body of six ft of carbonate that mills 90 ounces silver and 50 per cent lead. Between the extreme head of Alder and Antelope creeks, Bill Seameids & Co. are said to own a mammoth gold ledge, of an unknown width, that mills about \$20 per ton in gold. Bill was at Alder City last evening with some of the other boys, and before leaving he grew so enthusiastic over his promising success that he agreed to have a 50-stamp mill in operation in 30 days. After visiting some promising lodes belonging to Rose & Harrington, we wended our way toward White Knob creek, passing "Camp Tuscarora" and a wonderful deposit of iron and lead called the Isabelle, owned by Owen & Hall. Here we found several camps, the inmates hard at work and confident. Ed. Kenney has a good location near the Copper King that shows a strong ledge of galena. Messrs. Gary and Lane are here erecting a comfortable log house and shop, and are preparing to do assessment. These boys own the south extension of the celebrated Grand Prize. To the north of the Copper King, Juel Reser & Co. have the Gray Eagle, Jay Gould, Silver Bell, and other properties, all of which show ore from the surface—and high grade at that—the Gould averaging 300 ounces. Near here also are the D. & R. G. Blue Wing, Steamboat and others, that are principally owned by Bill Burnett, of the Battle Ground Station. William is looking for a claim near his ranch above, which if he succeeds in locating without having it jumped will prove a bonanza. He intends working it by both day and night shifts. Dow & Pratt own the Pilot mine, and have a good grade ore and plenty of it. One of the big mines of this district is the Black Daisy, Franklin & Co. owners. They have not less than 400 tons of ore already on the dump and plenty of more in sight.

ORE AND BULLION.—*Wood River Times*, June 10: During the month of May, 1,480,490 pounds (or over 740 tons) of ore were shipped from this point by the Hailey Sampling Works. Two carloads of copper matte from the Ramshorn Smelter were also shipped. The ore carried the usual average of 150 ounces silver and 60 per cent lead, and was therefore worth over \$200 per ton. The total value of the ore and matte shipped during the month, therefore, exceeds \$200,000. There is a considerable quantity of ore and bullion at the various mills, smelting works and on the mine dumps, which are just beginning to find their way to the railroad at this place, the roads having but lately become practicable. The shipments during the current month will probably be twice as heavy as they were last month.

THE MULDON FURNACES.—Colonel Ballantine, Supt., of the Little Wood M. and Smelting Co., and Fulton Haight, Superintendent of the Muldoon and other mines, are in Hailey, but will leave for Muldoon to-morrow. Colonel Ballantine has just returned from Philadelphia, where he went to consult with the trustees of his company. He says he will blow in one of his 40-ton furnaces about the first day of July, and that he will blow in the other as soon as he gets his concentrating works going. These will be obtained here, from the new foundry. After looking over the prices in the East, Colonel Ballantine concluded that he could do quite as well here as to prices, and much better in the way of possible re-

pairs. He expects to start up his concentrating works by the first of August.

LAKE CREEK CLAIMS.—*Ketchum KeyStone*, June 11: The mining outlook of Lake creek is encouraging this year and we are lead to believe that before long that section will be one of our most productive tributaries. It is characterized by large and extensive ledges containing free smelting ores just a little below the usual grade of this region. It is partially owing to this difference in grade and partially to the rude facilities of transportation, and the snows at that altitude, that the Lake creek properties have in general, suffered slow development. But these disadvantages are nothing in the face of capital and enterprise, and the time is close at hand when the Lake creek country will figure conspicuously as a factor in the leading industry. The usual grade of ores in that locality is from 50 to 75 ozs. silver, and 40 to 60 per cent lead. The following prospects constitute the best in that section and are known as the Homestake group.

THE ALPINE.—This prospect is the property of T. F. Shaw, James Moore and T. B. Mulkey. It shows a well formed ledge and has several tons of good ore on the dump. The Alpine is uncovered in many places but not to exceed 10 ft in depth.

THE HOMESTAKE.—Is the original location among the group that bears its name, and is owned by Harry Frost, J. C. Swift and others. It has a 55-foot tunnel, a 50 foot shaft and about 15 tons of good ore on dump. The vein shows as well as any on the ledge.

THE MERKIMACK.—Is owned by Mr. Stow, and is perhaps the best developed lode in the group. It has a 50-foot tunnel with 12 inches of solid ore in the face; 75 sacks of which were shipped two years ago and returned a net profit of 45 ozs per ton.

THE DIXON.—Is developed by a forty-foot shaft and a twenty-foot tunnel. The ore is remarkable in being a little higher grade than that of the others, assaying from 45 to 300 ozs. in silver and from 50 to 60 per cent lead. The whole group is characterized by good walls and fair working ground.

MONTANA.

A GOOD THING FOR TEN MILE.—*Helena Independent*, June 12: Prof. J. G. Murphy has returned from a trip into Ten Mile district, where he has been to get a sample lot of ore to ship East for testing it to ascertain the most economical method of extracting the precious metals. The sample lot of ore consists of about 500 pounds from the Stanton, Basset, Coyne and other mines in that particular group. The ore is silver lead. The present owners of the mines, we believe, are making a move to sell them. They are men of means, and if they do not sell they will work the mines themselves. So, in any event, the mines are to be opened and worked, and doubtless reduction or concentrating works will be erected, as the only point remaining to be settled is to ascertain the most economical method of treating the ore. Prof. Murphy says that since his last visit to the district, two years ago, there has been much improvement both in development and the appearance of the numerous mines of the district.

NEW MEXICO.

SILVER MONUMENT.—*Black Range*, June 13: Work is progressing satisfactorily on the Silver Monument mine. The shaft has been cut through from the tunnel to the surface and ten men are now at work taking out ore and retrimbering in places where the previous work was thought to be insecure. Two car loads of the best ore will be shipped at the earliest date possible. The road to the mine is almost completely and as soon as it is finished there are 200 tons of non-shipping ore which will be brought down to the concentrator. There are several mines in the Black Range which contain bodies of rich ore and which would if worked, help the country greatly and pay a good revenue to the owners. But they lie idle and the proprietors thereof will neither work the mines themselves nor lease them to those who will work them. The Mackey lode, in the Magdalena's, has a shaft of 65 ft, and is very rich in chlorides, native and horn silver. Assays run from 80 to 600 ounces to the ton. The concentrator has added about 900 ft of sluice boxes in which to make a saving of the mineral which may be running away in the tailings. It is expected that considerable time and labor will be required to make a new machine do the best of work on strange ores, but Mr. Castle is fast reaching that desirable point. With the arrival of the new screens, rolls and crusher jaws, there will be a radical improvement in the working of the plant.

UTAH.

REVIEW.—*Salt Lake Tribune*, June 13: The great body of snow in the hills, surpassing that of any former year in many places, makes the opening of the hill roads very slow and expensive this year. Usually at this date the snow is practically out of the way, but it is very much in the way so far this season. The movement of the metals, however, for the past week has been quite active. The receipts of bullion in this city for the week ending June 11th, inclusive, was \$137,554 82; of ore, \$3,700, the first ore receipts for more than a month. The receipts of the week previous were \$113,783 86 in bullion. The shipments of the Horn Silver for the week amounted to 17 cars of bullion, \$51,000. Total product for the year to date, \$977,000. The shipments of Ontario bullion for the week were 34 bars, valued at \$36,909 68, bringing up the total shipments for the year to \$685,648 27. Sales of Ontario stock for the week in New York amounted to 60 shares, on May 31st, at \$200; on June 2d, \$19 00. The Stormont sent up on the 5th three bars of Stormont silver, \$4,150. The Hanauer smelter produced during the week six cars of bullion, \$15,400. T. R. Jones & Co. received four cars Day bullion, \$15,985 50. Nevada ores to the value of \$1,250 were received on the 9th; also one car of Mayflower ore, \$2,450, on the same date.

ECONOMICAL.—*Pioche Record*, June 7: The Stormont Mining Company, of Silver Reef, is working about fifty men. The affairs of the company are being run very economically. When the roads are bad and the teams are unable to haul ore to the mill, the men are knocked off at the mine for four or five days at the time. Close work.

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Rand, improved, 3 1/2".....	1,441 "
Ingersoll, D2 3", beat Rand 3 1/2".....	744 "
Ingersoll, D2 3", beat National 3 1/2".....	505 "
Ingersoll, E 3 1/2", beat Rand 3 1/2".....	560 "
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National beat Rand.....	139 "

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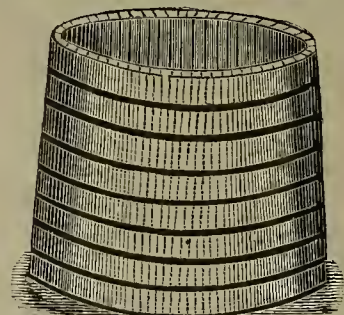
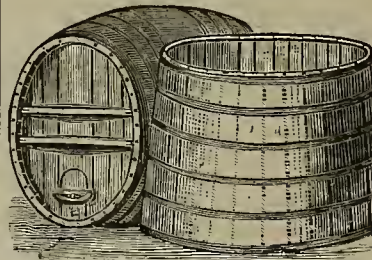
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Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR: The four-foot Centrifugal Roller Mill, bought of you in August, 1882, for the Whittier Gold Mining Company, of Shingle Springs, has given entire satisfaction, both on our own and on custom work, saving from 85 to 90 per cent of the gold in the mill. In conclusion I will say that we are so well pleased with it that Mr. Whidden and myself are pitting one of the same size on the Tohongo gold mine, near Ravenna, in Los Angeles county.

Yours truly, P. A. EASEY,
34 California St., S. F.

FINE GOLD GULCH, Nov. 10, 1883.

Mr. F. A. Huntington, San Francisco, Cal.—
DEAR SIR: In reply to your inquiry concerning the working of your Centrifugal Roller Quartz Mill, I am pleased to say that I run one of them for seven months, doing custom work on different varieties of rock, and that the mill give satisfaction in every respect, and did all that you claim for it.

Yours truly, BYRON JENNINGS.

GARIBALDI MINE, Dec. 17, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR: In reply to yours of the 10th inst., I take pleasure in assuring you that your Centrifugal Roller Quartz Mill gives entire satisfaction, and I can heartily recommend it to mining men who want a cheap and efficient crusher. Yours truly, E. I. PARSONS, Supt.

32 WASHINGTON AVENUE, }
SAN FRANCISCO, Dec. 29, 1883. }

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR: Having run one of your Centrifugal Roller Quartz Mills on sample lots of rock from more than twenty different mines, I must say that in every instance it has given the best of satisfaction in every particular; and I recognize its superiority over any other mill manufactured. Very truly yours, D. O. MOWRY.

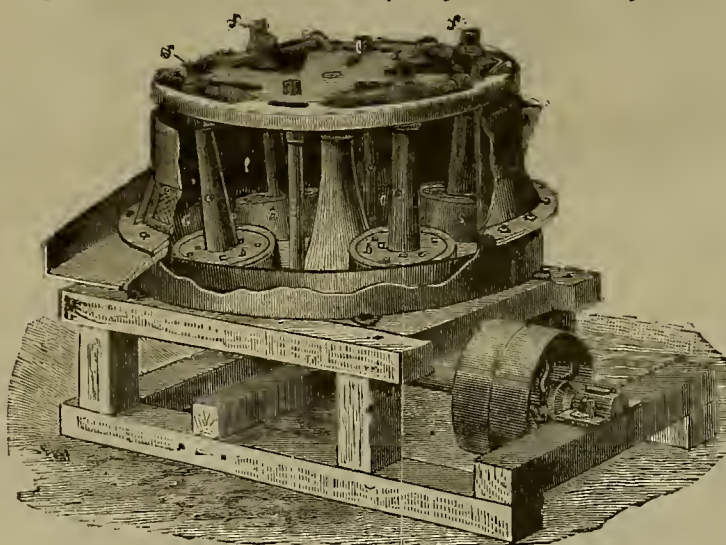
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2. Freight to mine one-fourth that of stamps.
3. Cost of erection at mine one-tenth that of stamps.
4. It runs with one-third the power per ton of ore crushed.
5. The wear is less than that of stamps.
6. The wearing parts are easily duplicated.
7. It has a much better discharge, and leaves the pulp in better condition for concentrating.
8. It is a better Amalgamator, saving fully nine-tenths of the gold in the mill; the balance can be saved on plates in the usual manner.
9. It is continually crushing; not like the stamp, using power to suspend it in air ninety-nine one-hundredths of the time and the balance making a thundering noise, and accomplishing comparatively small results. It is as far in advance of the stamp mill as the present method of making flour with improved rolls is over the Indian's mode of crushing corn in a stone mortar.

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SONORA, CAL., Dec. 1, 1883.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR: In reply to yours of recent date, inquiring about the Centrifugal Mill which I bought of you, I will say that I have run the mill four months on hard rock; and I take pleasure in adding that the mill has in every way given the best of satisfaction.

Yours truly, J. H. NEALE.

GARIBALDI MINE,
Calaveras Co., Cal., Dec. 17, 1883. }

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR: In answer to your inquiry concerning the working of the five feet Centrifugal Mill, bought of you for the Garibaldi mine in Calaveras county, I take pleasure in saying it gives entire satisfaction in every respect, and I only regret that the mine does not warrant the purchase of more of them and the continued use of the one now in operation. Very truly yours, O. B. SMITH.

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR: Your Centrifugal Roller Quartz Mill has run on the Whittier Gold Mining Co. property at Shingle Springs, El Dorado Co., Cal., about four months, and it has done good and satisfactory work, a greater proportion of gold remaining in the mill than in the stamp battery. FRED JONES, Supt.

HILBRETH RANCH, Fresno Co., Cal., }
January 11, 1884. }

F. A. Huntington, Esq., San Francisco, Cal.—
DEAR SIR: In regard to your mill (Centrifugal Roller), I have crushed about 500 tons of rock in the mill, and am glad to say that it has given entire satisfaction, and can recommend it to the public as the most expeditious and least expensive method for crushing and milling ore that I have ever seen. Truly yours, THOS. HILBRETH.

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Those improving water power should not fail to write us for New Prices, before buying elsewhere. New Ships and New Machinery are provided for making this Wheel. Address

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Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First street, a Rutherford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below costs, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. References as to above can be had upon applying to this office.

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Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

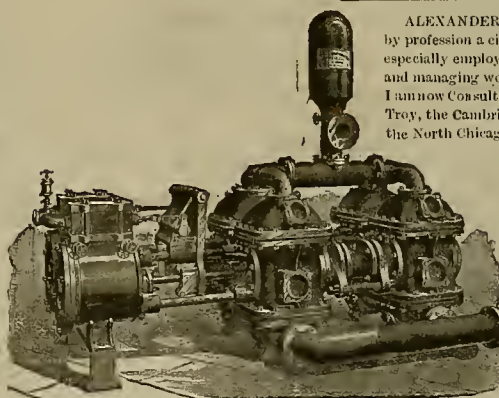
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Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of the Mining and Scientific Press, San Francisco, at favorable rates.

WORTHINGTON MINE PUMP.



ALEXANDER L. HOLLEY, being duly sworn, says: I am by profession a civil and mechanical engineer. I have been especially employed during the last ten years constructing and managing works for the manufacture of Bessemer steel. I am now Consulting Engineer to the Bessemer Steel Works of Troy, the Cambria Iron Works, the Bethlehem Iron Works, the North Chicago Rolling Mills, the Joliet Iron and Steel Works, and the Edgar Thomas Steel Works. In all Bessemer Works the hydraulic machinery is the most expensive and the hardest worked part of the plant. Any delay or serious derangement in its operation is fatal to the commercial success of the Bessemer process. After extensive acquaintance with the WORTHINGTON ENGINES, and with all such other forms of pumping engines as have been applied to the purposes required, I have adopted it exclusively, and to my knowledge it is adopted in every Bessemer works running or building in America. I have also, for the same reasons, adopted the WORTHINGTON PUMPS for feeding boilers.

WILL CONTRACT TO RAISE ANY REQUIRED HEIGHT SINGLE LIFT with our NEW PATENT MINE PUMP. Recent practical tests in Deep Mines of Mexico demonstrate this to be the BEST MINING PUMP extant. The largest stock of PUMPS for all purposes west of New York at our

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DEWEY & CO. { 252 MARKET ST., S. F. } PATENT AG'TS.
Elevator 12 Front St.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 254 Market St., S. F.

FOR WEEK ENDING JUNE 10, 1884.
 299,945.—DREDGE—J. A. Ball, Oakland.
 299,946.—PAPER WEIGHT—C. J. R. Ballard, Orland, Cal.
 300,203.—REVOLVING BOOK STAND—D. D. Bowman, Eureka, Cal.
 300,216.—SAWMILL—P. M. G. Chisholm, S. F.
 300,053.—EARTH BORING AUGER—C. De Mezer, Santa Clara, Cal.
 300,054.—BRICK-KILN—W. H. De Valin, San Rafael, Cal.
 300,056.—HORSE DETACHER—O. Dupas, San Rafael, Cal.
 300,067.—HEADER AND THRASHER—C. Grattan, Stockton, Cal.
 300,250.—STOCK CAR STALL—W. Holden, Los Angeles.
 300,083.—SOLDERING MACHINE—M. Jensen, Astoria, Or.
 300,103.—MILLSTONE DRESSING MACHINE—John Miller, Milton, Or.
 300,281.—EXPLOSIVE COMPOUND—W. R. Quinn, S. F.
 300,142.—HOISTING GEAR—L. & A. Scoville, Oakland.
 300,332.—UNIVERSAL BALL JOINT—A. W. Von Schmidt, S. F.
 300,333.—DREDGING MACHINE—A. W. Von Schmidt, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO. in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

HEADER AND THRASHER.—Christopher Grattan, Stockton. No. 300,067. Dated June 10, 1884. This invention relates to certain improvements in that class of apparatus by which grain is harvested, threshed and cleaned in a series of continuous operations performed by a machine which is propelled about a field. The invention consists in a supplemental carrier belt to receive and convey the straw and chaff as they escape from the straw-carrier and cleaning shoe, together with a means for adjusting the same and a shield or guard and directing chute.

Mining Share Market.

The market is still slow, but a move is being made on the Comstock which may result in a more favorable condition of things. At the north end they will soon be ready to begin prospecting at the great depth of 3,210 feet, at which point a station is now being opened in the Mexican winze. It was intended to open this station exactly on the 3200 level, but at that point the ground was a mixture of quartz, clay and porphyry—clay predominating—and too soft for a station. This material is thought to be the east side of the vein found on the 3100 level. While the quartz thus far found is metal bearing, still it is of a low grade. However, the indications are that they will not drift far to the west from the new station before cutting the ore vein.

The Directors of the Mexican mine at a meeting this week adopted the following resolution:

WHEREAS, The 3200 level of this mine has more favorable inducements for ore than the lower of Ophir, Union or Sierra Nevada mines; and, whereas, the sinking of shafts at such depths is attended with great difficulty and expense, now, therefore, be it

Resolved, That the Superintendent of this company be and he is hereby authorized and instructed to make arrangements with the Superintendents of the aforesaid companies referred to, whereby the said adjoining companies shall each bear one-fourth of the expense of immediately sinking the said winze of the Mexican mine to the 3300-foot level, or until the judgment of the said Superintendent deems proper.

At the middle mines the Hale and Norcross folks are regularly extracting and shipping ore from the 200 level. Work has not yet been resumed on the 2800 level, where there is known to be some ore that yields good assays. All work in the lower levels of the middle mines is now awaiting the starting up of the Cornish pump at the 2900 level of the Combination shaft. This pump will be in place and running in about three weeks.

Secure the Reduced Rate.

After the first of April, 1884, we announced a reduction of the price of the MINING AND SCIENTIFIC PRESS from \$4 to \$3 a year to all who would settle up arrears at old rates and pay in advance thereafter. There are some who have not yet taken advantage of this offer, and we would therefore urge all subscribers still in arrears to remit what is due us to this date, at the rate of \$3 a year, and pay in advance for another term at the reduced rates for new subscriptions paid in advance.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Belmont M Co.	Nevada.	37.	15.	May 26.	June 30.	July 28. J. W. Pew.	310 Pine st.
Bullion M Co.	Nevada.	29.	25.	May 19.	June 20.	July 10. J. M. Brazell.	328 Montgomery st.
Butte Creek Hyd. M Co.	California.	9.	10.	May 19.	July 10.	July 30. B. L. Taylor.	230 Montgomery st.
California M Co.	Nevada.	12.	20.	May 20.	June 27.	July 24. C. P. Gordon.	309 Montgomery st.
Cheva Santa M Co.	Mexico.	2.	10.	May 19.	June 2.	July 15. W. Letts Oliver.	328 Montgomery st.
Cou Imperial M Co.	Nevada.	20.	05.	Apr 30.	June 5.	June 26. C. L. McCoy.	309 Montgomery st.
Columbus Con M Co.	Nevada.	3.	25.	June 2.	July 7.	July 28. J. M. Barrington.	309 California st.
Champion M Co.	California.	15.	10.	June 13.	July 17.	Aug. 6. T. Wetzel.	322 Montgomery st.
Excelsior Water M Co.	Nevada.	12.	20.	May 22.	June 27.	D. C. Bates.	309 Montgomery st.
Gold Channel Drift M Co.	Nevada.	20.	03.	May 3.	June 6.	June 26. C. E. Elliott.	309 Montgomery st.
Grand Prize M Co.	Utah.	23.	25.	May 12.	May 24.	June 20. W. Van Bokkelen.	419 California st.
Gravel M Co.	California.	15.	05.	May 13.	June 28.	July 17. H. Kunz.	209 Sansone st.
Excelsior Water M Co.	California.	6.	50.	Jan 29.	July 1.	July 23. H. B. Wheaton.	215 Sansone st.
Golden Channel Drift M Co.	California.	1.	03.	May 22.	June 23.	July 23. A. B. Paul.	328 Montgomery st.
Golden Fleeces G M Co.	California.	32.	50.	May 7.	June 9.	June 26. P. Schirmer.	412 Sixth st.
Gould & Curry S M Co.	Nevada.	48.	50.	June 6.	July 11.	Aug. 4. A. K. Durbin.	309 Montgomery st.
Hale & Norcross S M Co.	Nevada.	82.	75.	May 10.	June 12.	July 2. J. F. Lightner.	309 Montgomery st.
Indian Spring Drift M Co.	California.	11.	05.	May 3.	June 6.	June 26. C. E. Elliott.	309 Montgomery st.
Loreto M and M Co.	Mexico.	7.	50.	May 21.	June 23.	July 9. H. G. Jones.	327 Pine st.
Mammoth Bar G M Co.	California.	6.	15.	June 9.	July 11.	Aug. 1. J. W. Pew.	310 Pine st.
Mayflower M Co.	California.	24.	25.	June 9.	July 15.	Aug. 7. J. L. Morison.	328 Montgomery st.
McIntyre Gravel M Co.	California.	11.	10.	May 19.	June 10.	July 2. J. F. Lightner.	309 Montgomery st.
Mexican G M Co.	Nevada.	27.	75.	June 11.	July 16.	Aug. 6. C. E. Elliott.	309 Montgomery st.
Monoc Lake H M Co.	California.	1.	50.	May 19.	June 2.	July 21. J. C. Winaus.	331 Montgomery st.
Morgan M Co.	California.	1.	100.	June 7.	July 11.	Aug. 30. C. S. Neal.	309 Montgomery st.
Peer M Co.	Arizona.	1.	25.	June 6.	July 15.	Aug. 5. A. Waterman.	309 Montgomery st.
Pebble M Co.	Nevada.	15.	25.	May 11.	June 11.	July 1. C. D. Edwards.	414 California st.
Rainbow M Co.	California.	11.	15.	June 16.	July 21.	Aug. 18. P. F. Mohrhardt.	311 Montgomery st.
Starlight M Co.	California.	1.	06.	June 14.	July 18.	Aug. 6. W. Battles.	513 Market st.
Star Hill M Co.	Nevada.	20.	05.	June 2.	July 8.	Aug. 23. W. E. Dean.	309 Montgomery st.
Sierra Nevada M Co.	Nevada.	79.	100.	May 10.	June 12.	July 2. B. L. Taylor.	309 Montgomery st.
Segregated Belcher M Co.	Nevada.	22.	100.	May 11.	June 11.	July 1. C. D. Edwards.	414 California st.
Union Con M Co.	Nevada.	27.	50.	June 9.	July 14.	Aug. 31. J. M. Barrington.	309 California st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
North Belle Isle M Co.	Nevada.	J. W. Pew.	310 Pine st.	Annual.	June 25
Union Con M Co.	Nevada.	J. M. Barrington.	309 California st.	Annual.	July 2

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D. C. Bates.	309 Montgomery st.	25.	May 19
Bodie Con M Co.	California.	G. W. Scissors.	309 Montgomery st.	10.	June 5
Derbee Blue Gravel M Co.	California.	T. Wetzel.	322 Montgomery st.	10.	May 27
Idaho M Co.	California.	D. C. Bates.	309 Montgomery st.	4.00.	Apr 2
Jackson M Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar 16
Kentuck M Co.	Nevada.	J. W. Pew.	310 Pine st.	10.	June 19
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery st.	10.	Apr 28
Standard Con M Co.	California.	Wm Willis.	309 Montgomery st.	25.	Mar 12
Syndicate M Co.	California.	J. Staudfeldt.	419 California st.	10.	Apr 5

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 22.	WEEK ENDING June 5.	WEEK ENDING June 12.	WEEK ENDING June 19.
Alpha.	1.05	1.10	1.10	.60 .65
Alma.	1.65	2.00	1.70	1.65 1.60 1.75
Andes.	.35	.40	.30	.25 .30 .25
Argenta.	1.00	1.00	1.00	.70 .85
Belcher.	1.75	2.00	.80	1.55 .60 1.60
Best & Belcher.	1.00	1.00	1.00	.70 .85
Bonanza King.	.60	.60	.50	.55 .50 .60
Bodie Isle.	.50	.60	.50	.55 .50 .60
Bodie Con.	3.00	4.15	3.30	4.00 .30 4.00
Benton.	.40	.40	.40	.35 .50 .45
Bodie Tunnel.	.55	.80	.60	.75 .60 .70
Bulwer.	.15	.10	.10	.15 .05 .10
California.	.10	.10	.10	.10 .05 .10
Challenger.	1.10	1.75	1.35	1.65 1.30 1.40 1.40
Chollar.	1.20	1.20	1.00	.85 .90 .90
Confidence.	1.20	1.20	1.00	.85 .90 .90
Con. Imperial.	.15	.20	.15	.20 .10 .20
Con. Virginia.	.25	.25	.20	.30 .35 .35
Con. Pacific.	1.25	1.40	1.20	1.30 1.15 1.25
Crown Point.	1.90	2.00	1.75	1.90 1.25 1.25
Day.	2.25	2.80	2.55	2.60 3.00 .00
Eureka.	2.25	2.80	2.55	2.60 3.00 .00
Eureka Tunnel.	.05	.10	.05	.25 .30 .20
Excelsior.	.05	.10	.05	.25 .30 .20
Grand Prize.	.10	.05	.10	.10 .10 .10
Gould & Curry.	1.20	1.40	1.05	1.25 .80 1.15 .35 .85
Hale & Norcross.	2.05	2.40	1.80	2.25 .50 2.15 .60
Homes.	.20	.30	.25	.30 .25 .25
Independence.	.20	.30	.25	.30 .25 .25
Julia.	.20	.25	.25	.30 .25 .25
North Belle.	.75	.85	.70	.80 .75 .75 .85
Martin White.	1.40	1.80	1.35	1.60 1.00 1.55 .50 1.00
Mt. Diablo.	2.10	2.25	2.30	2.10 2.10 .20
Nevada.	.30	3.20	3.15	3.20 3.15 3.15 .35 .40
North Belle Isle.	.25	.30	.20	.25 .15 .20 .20
Occidental.	1.00	1.20	.90	1.00 .90 1.00 .60 1.05
Ophir.	.20	.30	.20	.20 .20 .20 .15 .20
Overman.	.40	.60	.35	.50 .35 .40 .40 .45
Potosi.	.40	.60	.35	.50 .35 .40 .40 .45
Pinal Con.	.70	.80	.65	.75 .65 .70 .60 .75
Savage.	1.00	1.40	.80	1.10 .50 1.40 .00
Seg. Belcher.	1.60	1.40	.80	1.10 .50 1.40 .00
Sierra Nevada.	.03	.03	.03	.03 .03 .03 .03 .03
Silver Hill.	5.25	5.50	5.50	5.50 5.50 .00
Silver King.	.25	.30	.25	.30 .25 .30 .10 .15
Scorpion.	.45	.45	.65	.45 .65 .45 .50
Standard.	.15	1.95	1.40	1.55 .85 1.40 .60 1.00
Union.	.65	.85	.60	.75 .55 .75 .35 .50
Uta.	1.80	2.05	1.75	1.80 1.60 1.80 1.60 1.90
Yellow Jacket.	1.80	2.05	1.75	1.80 1.60 1.80 1.60 1.90

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

PACIFIC COPPER M. Co., June 14th. Location, Arizona. Capital stock, \$5,000,000, in 100,000 shares. Directors, A. W. Heath, Louis J. Hann, John A. Drinkhouse, G. W. Terrill and R. J. Gillett.

REBELLIOUS ORE REDUCTION CO., June 16: Capital stock, \$5,000,000. Trustees, W. B. Douglass, L. A. Gates, A. M. Shields, W. L. Dawson, Joseph Denkselspiel.

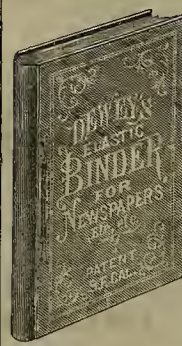
WORLD'S ELECTRICAL REBELLIOUS ORE REDUCING CO., June 16. Trustees, W. B. Douglass, L. A. Gates, A. M. Shields, W. L. Dawson, Joseph Denkselspiel.

OLETA M. Co., June 16th. Location, Amador county, California. Capital stock, \$5,000,000. Trustees, E. E. Phelps, C. N. Holmes, D. S. Gellett, T. H. Ganeard, C. S. Bush. Capital, \$500,000.

"First Class and Reasonable"

That is what the best of old travelers and patrons of the ST. JAMES HOTEL, SAN JOSE, say. Mr. Tyler Beach, its proprietor, is one of the early and most enterprising of San Jose's citizens, and, like his hotel, is highly esteemed.

An Easy Binder.



A. T. Dewey's patent elastic binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable, and so simple a child can use it. Price, (size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Publishing Co.'s journals, Harper's Weekly, and Scientific American), 85 cents; postage 10 cents. Postpaid to subscribers of this paper, 50 cents. For sale at this office. Send for illustrated circular. Agents wanted.

Bullion Shipments.

Horn Silver, June 10, \$18,000; Ontario, 13, \$11,706; Hanauer, 10, \$5,100; Mayflower, 10, \$2,450; Hanauer, 11, \$2,350; Ontario, 11, \$4,070; Horn Silver, 11, \$9,000; Hanauer, 12, \$3,050; Horn Silver, 12, \$6,000; Ontario, 12, \$6,122; Stormont, 13, \$3,075; Hanauer, 13, \$5,570; Ontario, 13, \$4,273; Horn Silver, 13, \$12,000; Hanauer, 14, \$2,950; Horn Silver, 14, \$9,000; Ontario, 14, \$598; Hanauer, 15, \$3,300; Day, 15, \$5,000; Horn Silver, 15, \$9,000; Southern Utah, 15, \$5,000.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

San Francisco Metal Market.

		THURSDAY, JUNE 17, 1884.	
ANTIMONY	Per pound	14	18 1/2
BORAX	Per Pound (extra)	16	18
IRON	Glenangerton, ton	254	0
Eglington, ton		20	00
American Soft, ton		29	00
Oregon Pig, ton		20	00
Cluget Cast, Nos. 1 & 2		32	50 (35 00)
Rehmed Bar		39	0
Horseshoes, keg		5	50
Nai Rod		7	1/2
Barrow, according to thickness		61	00
Silver Bull Cast, lb.		14	16
Black Diamond, ord. bag, silver		14	16
Drill		15	00
Machinery		12	14
COPPER	Ingot	22	00
Braziers sizes		25	27
Box sheets		25	00
Boil		25	00
Old		8	00
		—	00
Cement, 100 fue		12	00
LEAD	Pig	4	1/2
Bar		7	00
Pipe		7	4
Sheet		8	00
Shot, discount 10% on 500 bags: Drop, 1/2 bag		2	10
Buck, 1/2 bag		2	30
Chilled, do.		2	50
TIN PLATES	Charcoal	4	00 (25 00)
Copper		4	00 (75 00)
Terne		6	15
I. C. Charcoal Roofing, 14x20		6	25 (6 50)
ZINC	By the cask	19	00
Sheet, 7x3 ft, 7 to 10 lb, less the cask		9	10
NAIL	Assorted	2	25
QUICKSILVER	By the flask	3	00
Flasks, new		1	05
Flasks, old		85	00

San Francisco Metal Market.

THURSDAY, June 17, 1884.	14c
ANTIMONY Per pound.	14c
BORAX—Per Pond (extra).	16c
IRON—Glenoraconkton.	25c
Edginton, ton.	20 00
American Soft, ton.	29 00
Oregon Pig, ton.	32 50
Clippers (tap, Nos. 1 to 4).	32 50
Refined Bar.	35c
Horseshoes, keg	5 50
Nat. Rod.	7 00
Norway, according to thickness.	61c
STEEL—English Cast, ft.	15c
Black Diamond, ordinary sizes.	14c
Drill.	15c
Copper—Ingot.	12c
Brass—sized.	25c
Fire-box sheets.	25c
Boil.	25c
Old.	8c
Pipe.	8c
Cement, 100 lbs.	12c
LEAD—Pig.	4c
Bar.	4c
Pipe.	8c
Shot, discount 10% on 500 bags: Drop, ft. bag.	2 10c
Buck, ft. bag.	2 40c
Chilled, do.	2 50c
PLATES—Charcoal.	7 00
Coke.	6 00
Terne.	6 15c
I. C. Charcoal Roofing, 14x20.	6 25c
ZINC—By the cask.	19c
Sheet, 7x3 ft. 7 1/2 lb. less the cask.	3 25c
NAILS—Assorted sizes.	3 25c
QUICKSILVER—By the flask.	29 00c
Flasks, new.	1 05c
Flasks, old.	85c

REMITTANCES to this office should be made by post-order or registered letter, when practicable. Cost of post-order, for \$10 or less, 8 cents; for registered letter, in addition to regular postage (8 cts. per half ounce), 10 cts.

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Educational.



TRINITY SCHOOL CHURCH, BOARDING AND Day School for Young Men and Boys, 1531 Mission St., San Francisco. Preparing for College and University. Easter Session opens Thursday, Jan. 4, 1884. Refers to: Wm. F. Babcock, Esq., Col. F. E. Kyrle, Joseph Poading Esq., Gen. L. H. Allen, Wm. T. Coleman, Esq., Geo. W. Gibbs, Esq. For information, address, REV. E. B. SPALDING, Rector.

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Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first class facilities, full corps of experienced teachers. Send for Circulars. LIFE SCHOLARSHIP, \$70.

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A BOARDING AND DAY SCHOOL FOR YOUNG LADIES.

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THE MISSES HARMON, Berkeley, Cal.,
Or E. J. WICKSON, 114 Clay St., S. F.

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FOR YOUNG LADIES,

1825 Telegraph Avenue, Oakland, Cal.

(ORGANIZED IN 1872)

The next year will begin on Wednesday, July 30, 1884. Address MISS L. A. FIELD, Principal.

ANDERSON & PATRIQUIN,

ANDERSON'S SPRINGS,

Near Middletown,
Lake County, Cal.

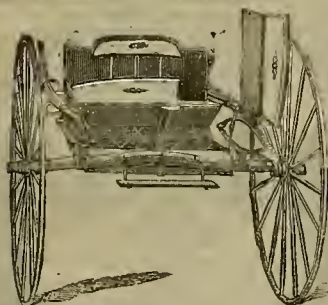
Nineteen miles from Calistoga, Napa County, five miles from Middletown and ten miles from the Great Geysers, between which and Anderson's Springs there are good wagon roads.
HOT SULPHUR AND STEAM BATHS for the cure of Rheumatism, Paralysis, St. Vitus' Dance, Dropsy, etc. Cold Sulphur, Soda, Magnesia and Iron Springs for Dyspepsia, Stomach, Liver and Kidney affections. Chalybeate Iron Spring for hemorrhages.

Scenery unsurpassed; climate mild and equable; consumptives generally improved in health and asthmatics are invariably relieved. Trout fishing in the grounds; deer hunting in the immediate vicinity.
New cottages for the better accommodations of guests. Cooking good.

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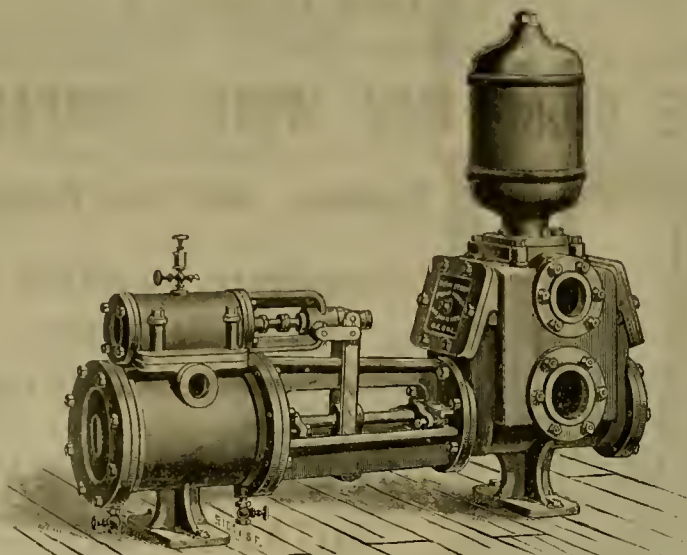
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Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

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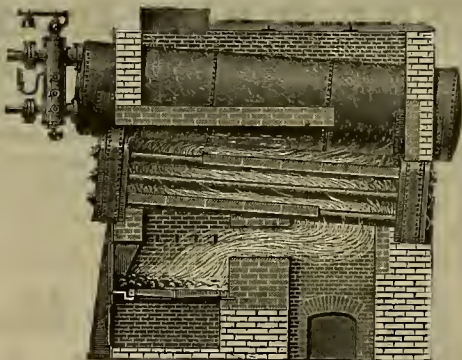
St. Louis, Mo., Sept. 28, 1883

Messrs. Adolphus Meyer & Co.—GENTLEMEN: We cheerfully certify that the "Heine Patent Safety Boiler" put up by you in our establishment has proved very satisfactory in its working. The chief points of excellence in the "Heine Safety Boiler" are its economy in fuel and space, freedom from scaling, aptitude for power and heating purposes, working equally well with clear and muddy water. We warmly recommend it to all using steam machinery. Yours truly,

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To Mr. H. Heine, Civil Engineer: In reply to your inquiry of September 23, we respectfully inform you that the three boilers built under your patents, under steam since September 25, 1881, at the Alexander Place Depot, as well as the two at Friedrich Strasse Depot, under steam since September 22, 1882, have given good satisfaction, requiring no repairs whatsoever to date. The internal cleaning of the boiler was always accomplished



with ease on account of the convenient arrangement of the tube caps, the adhesion of scales being fully prevented thereby, and the boilers kept in prime condition.

(Signed): BRAUCKE.

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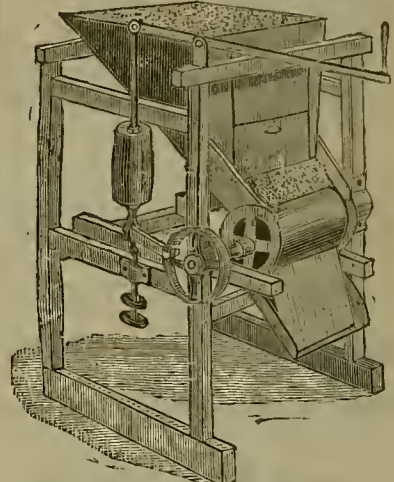
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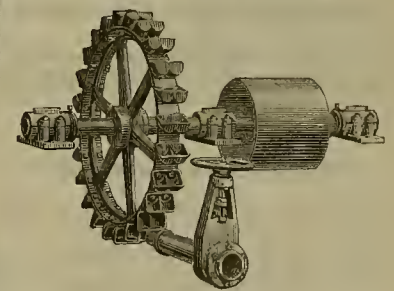
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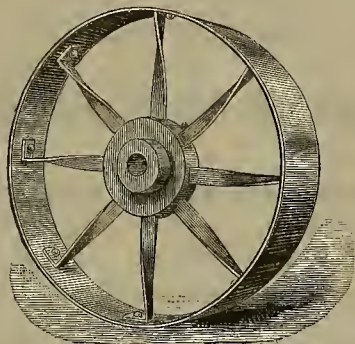
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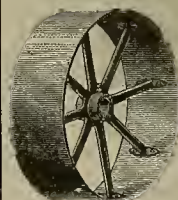
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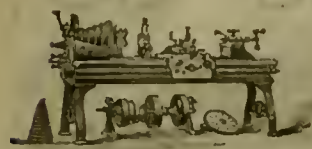
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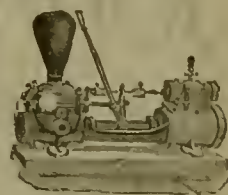


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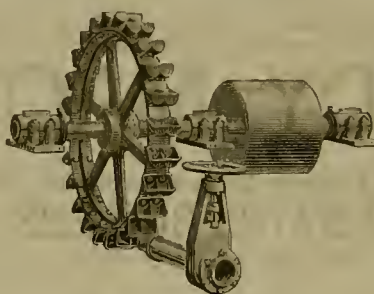
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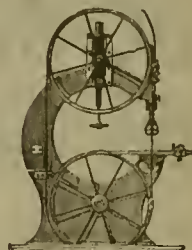


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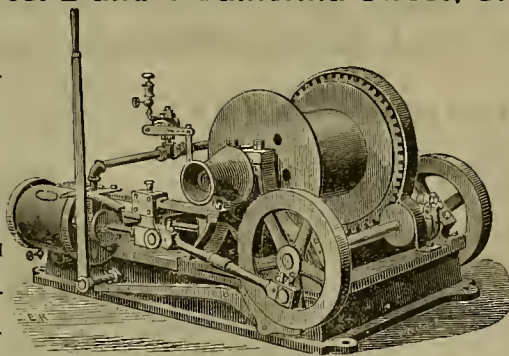
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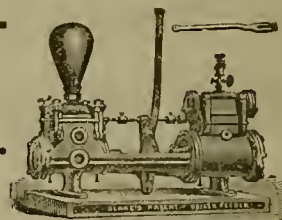


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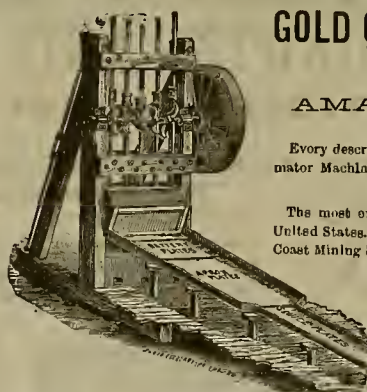
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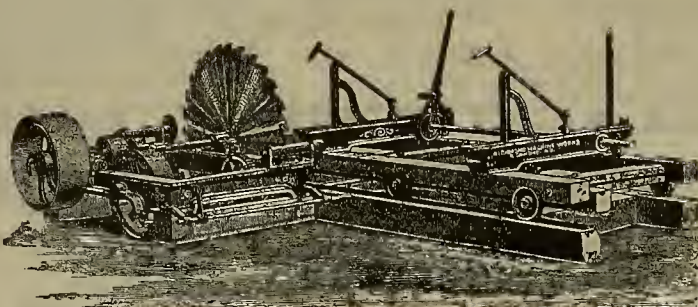
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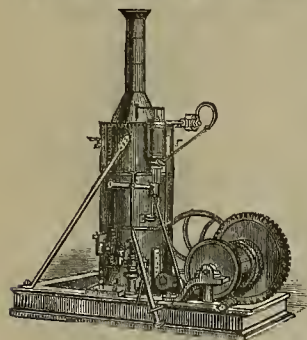
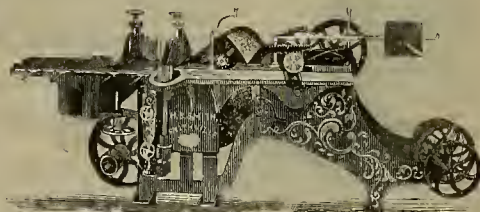
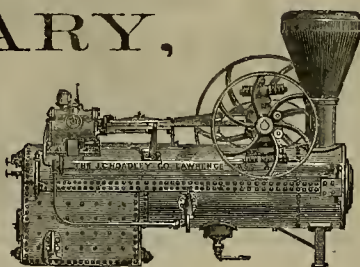
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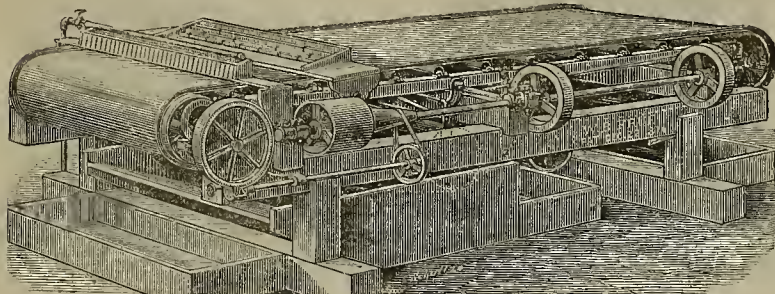
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To those Intending to Manufacture or Purchase the So-called "Triumph" Concentrator, we Herewith State:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That we are and have been ready, at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

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January 3, 1884.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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Publishers.

SAN FRANCISCO, SATURDAY, JUNE 28, 1884.

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The Triumph Ore Mill.

A few months since we referred briefly to a trial of a new form of ore mill, invented by Frank A. Hill of this city. Since that time several of the mills have been built and submitted to satisfactory practical working tests. An engraving of the new machine is shown on this page. It is quite simple in operation.

In a suitable bed is a circular V-shaped groove or channel, open at the bottom as shown in the sectional view. In this groove or channel are placed steel rollers or wheels of corresponding shape on their edges. Above them is a large open casting marked, 3 on the large cut, having an inserted V-shaped groove or channel, 4, in which the upper part of the rollers, 5, fit. This channel is formed in the pan or battery, 6.

As the ore falls into the interior, it finds its way into the V-shaped channels, and the broad faces of the rotating rollers, crush it. An end view of the channel is shown in the section.

The centers of the rollers, 5, are open, as shown, to allow the quartz to have free motion all over the machine. The ore is crushed both in the lower and upper channels, as the rollers run free and close together. Around the rollers is a circular screen, 9, through which the pulp passes, the discharge being all around the mill. Below the screen is a circular apron, 7, on to which the pulp falls, and which is provided with amalgamated plates, from this the tailings, etc., fall into the usual sluices.

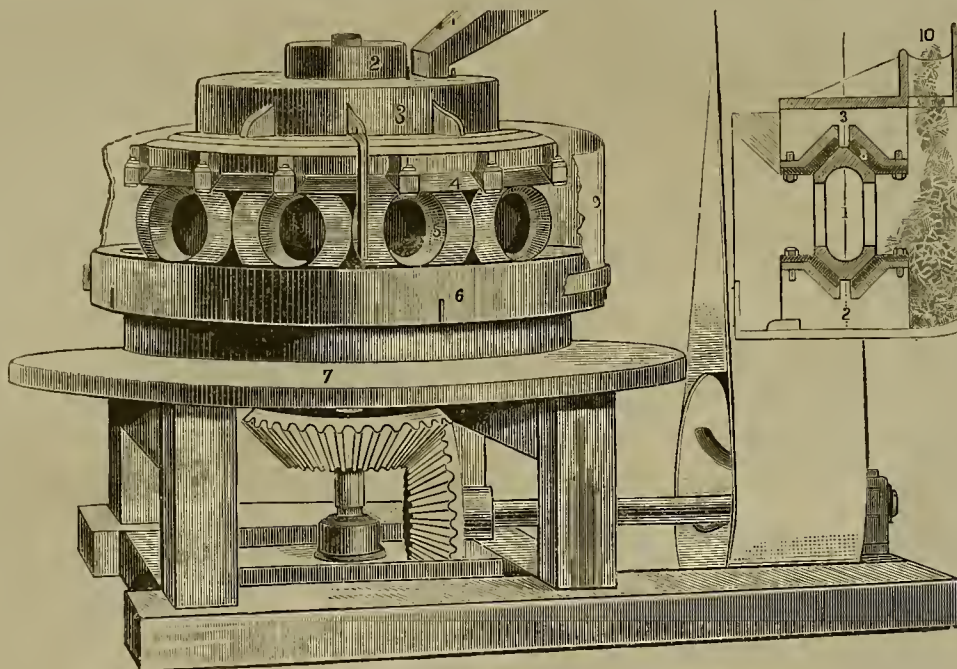
This upper casting is given a rotary motion by means of an upright shaft and gearing as shown. On top of it is placed a weight which may be changed to give more or less pressure on the rolls. As the weight of this casting rests on the upper edges of the rollers, they are revolved rapidly in the circle in the grooves provided for them, when the casting or frame is revolved by the gears. The upper casting is open at the top and ore which is first passed through a rock breaker is led into the machine by a suitable spout as shown at 10 in the sectional view, water being admitted with it.

The weight, 2, is lifted by a suitable derrick when the weight is to be reduced or a clean up is to be made. The V-shaped channels have removable dies, 8, made of steel. In the section, 1 represents the steel wheels, (cut in two showing end view) showing how they run in the channels; in the same view, 2, 3, shows the opening one and a half inches wide in the channels.

This machine weighs about 3,000 pounds. It is manufactured at the Rice Engine and Boiler Works, 56 Bluxome St., in this city, where one can be seen in operation at any time an appointment is made. There have been many attempts made to perfect a practical machine of this character, and there have been many failures, but Mr. Hill has really produced a machine which, considering the work it will do, the power required, and the cost of machinery, is something wonderful, and those having ores to work ought to investigate for themselves. Mr. Hill informs us that he is able to work over 1,000 pounds an hour; and the capacity may be

increased by adding weights to the machine as described. It will crush 12 to 15 tons in 24 hours and more if required.

In another column are printed some opinions on the workings of this mill, by men of experience in this line, which are really encouraging to the inventor. The machine is at work in several places, and steps have been taken to secure the patent. Those who cannot get the opportunity to see the mill at work can send for circulars, prices and further details, addressing, "Hill's Triumph Ore Mill," care of H. W. Rice, 56 Bluxome St., San Francisco. Mr.



HILL'S TRIUMPH ORE MILL.

Hill proposes to put this machine in the coming Mechanics' Fair in this city, with concentrators and other appliances to properly work ore. Persons having small lots of ore—say five tons or so—who wish it worked, may correspond with him on the subject, as he wishes to get ore enough on hand to keep the mill running.

HUEL AND WHEAL.—The question is often asked as to the meaning of the terms "huel" and "wheal," the one or the other of which is so generally used as a prefix to the names of English mines. By some the two terms are considered synonymous, the former being a corruption of the latter. Both these words had their origin far back in the history of English mining, and what appear to be the best authorities explain their original application as follows: In the early days of English mining the only way of freeing the mines from water was by use of the wheel—a water wheel with a pump or other water lifting appendage; hence those mines which employed this device had the term "wheal" attached as a prefix to their names, which was the common way of spelling the word in olden times. "Huel" is a Cornish term applied to a hole. Hence a mine without a "wheal" for raising water was simply a hole in the ground, and to distinguish it from a "wheal" mine the term "huel" was used as a prefix. There are some, however, who insist that the words are synonymous, and that "huel" is simply a corruption of "wheal."

Blasting and Electricity.

The system of exploding a number of shots simultaneously in rock blasting is making its way slowly into common use abroad. There are many advantages of the system, though there is a prejudice against it, owing to past failures.

But the obvious certainty obtained by using powerful currents and the ease with which such currents may be applied when the works are lighted by electricity, should be sufficient to induce the disappointed to try again. A good ex-

The New Move on the Comstock.

Last week we mentioned the decision of the Union, Sierra Nevada, Mexican and Ophir Mining Companies, to shut down all work, except that on the Mexican winze, which is now at the 3200 level, and will be extended to the 3300, from which point drifts will be run into all the mines of the series. The winze is in easy-working ground, and should it so continue, the connection with the 3300 level can be made within the next two months. The east side of the winze is in vein matter, which is continuous from the 2300 level down. In the other mines of the series pumping will be continued.

The object of this move is to economize and spend money on the most available point only. Superintendent Patton is now more hopeful than he has been in a long time. He says that at a point eighty or ninety feet below the 3100 level a marked change of formation was encountered in the Mexican winze. Much clay began to appear, and in large masses, whereas, above, for several levels, the ground was barren and pinched, with only little starved streaks of clay. The ground in which they are at present at work—ten feet below the 3200 level—looks very much as did that at and about the big bonanza in the California and Consolidated Virginia. There are large masses of clay, and everything shows that there has been a great commotion in the vein. All is broken and tossed about as though by a great upheaval of something below, and it is hoped that this something is an ore body of large size.

The *Enterprise* says the masses of clay encountered are strongly striated vertically, showing that there has been much movement up and down of the rock forming the sides of the vein. These strong scratchings in the smooth surface of the bodies of clay are familiar to all old miners on the Comstock, and have always been found above and alongside of the big ore deposits. Everything indicates that the winze is now in the jumble of clay and rock which forms the top of a large deposit of ore. No such signs of great disturbance has been seen above at any place, and this appearing to be the most favorable point for exploration has decided Mr. Patton and the officers in favor of at once going down to see what lies under the broken material now filling the vein.

Mr. Mackay who has been interviewed, said that this move was in no sense a virtual shut down, but only a concentration of work at one point. He said that if any considerable number of stockholders were dissatisfied with the move, and would guarantee money on the workings of the mines on the old plan, the management would turn the mines over to them and let them work them.

A NEW ACID FACTORY.—The plans and specifications for the largest acid factory on the coast have just been finished. The works will be erected in Marin County and it is intended to furnish all kinds of acids, of which quite a large quantity is used, to the entire coast and Mexico. The estimated cost of the factory will be \$125,000, all furnished by a local capitalist.

ample of the application of the lighting current to the ignition of blasts is cited by Mr. Geo. C. Andre as having come under his notice in Germany. The mine is a colliery, and the surface works are lighted by arc lamps. Underground a stone drift is being driven, and this drift is lighted by incandescent lamps. In the face, from twenty to twenty-four shots are placed, and an electric fuse in each is joined up in parallel circuit by means of bare iron wire and connected with the lighting cables in such a way that the current can be shut from the lamps into the fuses. The result is in the highest degree satisfactory. Misfires are unknown and the effect is wonderfully good. It is estimated that from twenty-eight to thirty-two shots would be needed if fired in the usual manner in succession, so that the saving of labor is in this case considerable, exceeding 25 per cent, both for the labor of boring and the quantity of explosive required.

The Anaconda mine, Montana, from which no ore is extracted except what is absolutely necessary to be taken out in order to extend the drifts, continues to be the heaviest producer in the Territory. It is now yielding about 5,000 tons of shipping ore per month, besides a vast amount which is dumped for treatment at the company's smelter when that vast enterprise shall start up. It is the most extensive copper mine in the United States, and is producing as much even now as the Calumet and Hecla, whose output for May was 2,265 tons.

CORRESPONDENCE

We admit, uncondensed, opinions of correspondents.—E.D.S.

Reasonable Wages and More Employment.

EDITORS PRESS:—You give more interesting, substantial scientific and valuable news in the SCIENTIFIC PRESS than I get from any other paper, and I take several of them. Yet I think you can do much that will increase your popularity with that class of readers who are interested in developments of the mines in the West. I have reference to reaching a certain class who now control labor of miners throughout the mining regions, and by their laws, rules and regulations keep a vast number of valuable mining properties from being worked as they should and would be were they allowed to do so. I know I am treading on ground that is liable to be scorched but I cannot help it. I have suffered with thousands of others who have struggled to keep my interest and mines going in Utah, Idaho, Nevada and Colorado. Of those in Nevada, I have suffered most. How, you may ask? I answer by the arbitrary rules of the Miners' Unions. They dictate to me what I shall do. They even threaten non union men if they continue to work at wages perfectly satisfactory to them and which are remunerative viz., \$3 per day. They threaten to go to the mine and compel them to stop work, and inform the Superintendent they will not be responsible for anything that may happen if he continues to employ them at those wages. They demand \$4 per day, and that they shall become members of the Union. It is one thing to lead a horse to drink and another thing to make him drink. I know that much, but intimidation has been practiced for years in all sorts of ways. Now, how does this prevent development of mines. The properties I have interests in have cost several thousands of dollars to open up; in some of them the ore is low grade, some high—where cost of production is such as to bar its being marketed, it is valueless; but if it could be marketed at even cost, work could be continued in hopes of opening and producing more, so as to become profitable. One fourth the cost of labor taken off would go to the value of the ore, and in our case it would have given more miners employment, and the property would to-day be in my opinion producing ore and giving employment to many miners who have been obliged to go prospecting for want of work. When I say our property, I speak of my own. I can see hundreds of them. Nevada, of all states, is under more arbitrary rule by the Unions than any I know of, in most of the other States, Union wages are about \$3. There are no good reasons why this rate should be demanded in Nevada; provisions and all else are as cheap in many mining districts as in other states where \$3 is only charged. There are many promising prospects in rich districts that are owned by men who have not capital to work them, that would produce some ore of a grade that would pay reasonable cost, and would be prospected if they, the owners, were permitted to control the labor question. But no; the minute a contract is let, it must be investigated by the Union to see if it is up to their standard; if not, quit is the order, the owner must succumb. Virginia City, Austin, Eureka and other old established districts have suffered and now suffer from the arbitrary rules and laws of the Miners' Unions, and the sooner the owners or corporations decide to run their own business in their own way, the better it will be for themselves, the miners and the country. There are cases where it is worth more per day than others, I am willing to admit, but not a universal rule. I would not go to Cœur d'Alene and work for the same pay I could get in Park City, Frisco, Utah or Eureka, Austin, Nevada or Leadville, or St. Elmo, or Gumison, Colorado, for living is more; other things being equal I should do so. I would like to see this matter duly investigated.

ONE WHO HAS SUFFERED.

Mining Camp, — District, June 13th.

IOWA HILL.—A. D. Bowley, of Iowa Hill, was in Auburn a short time last Wednesday, and in answer to a question as to how the times were at the Hill, he remarked: "Well, we are taking out the nuggets." He then, as proof of his statement, proceeded to exhibit several hundred dollars worth of handsome washed gold specimens, ranging in value from about one dollar to nearly \$100, recently taken out by him from the Golden Gate drift mine, located near Iowa Hill. He thinks, without doubt, he is on the famous Succor Flat channel, and the appearance of the gold goes to prove that he is. The old Succor Flat drift mine is working quite a force of men, and is still doing very well. Other mines in the district, he reports as panning out first rate, which gives to Iowa Hill and vicinity, quite an active appearance and an encouraging outlook.—*Placer Herald*.

LOCOMOTIVE BUILDING.—Fifty years ago we imported a locomotive from England as a sample. We now build millions upon millions of dollars' worth for home use and are able to compete with England in all parts of the world. Nearly all the locomotives used in the English colonies are built in the United States.

Cement.

Nearly all cement produced in this country is made from natural cement rock. The Rosendale and Louisville cements which form the great bulk of the production, are natural cements. Portland cement, most of which is imported, comparatively little being made here, is an artificial cement. Besides this, which forms by far the greater part of the importations, we import Roman (a natural cement), Keene's Lafarge, selenitic, lime of Teil and other varieties.

The total cement product of the country in 1882 is estimated by the best authorities at from 3,000,000 to 3,500,000 barrels. Probably the mean of these (3,250,000 barrels) is very near the true production. Of this, \$5,000 barrels, of 400 pounds each is estimated to be the production of artificial or Portland cement. The average value of this is about \$2.25 per barrel at the works. A barrel of natural cement weighs 300 pounds and has an average value at the works of \$1.10. Estimated on this basis the total value of the cement production for the year 1882 was \$3,672,750.

The principal center of the production of American cement are:

First, Ulster county, New York, at Rosendale and in the valley of Roundout creek, where the material of this cement is found in abundance. From the name of the principal producing center of this district, the name Rosendale is given to all natural cement produced in this neighborhood, as well as to all that made from materials obtained here, although prepared for use at other points, as Troy, Brooklyn and Cohoes. The rock used for this purpose is the lowest stratum of the Lower Helderberg group, and the topmost member of the Niagara group. The production of Ulster county is estimated to be between 1,500,000 and 1,600,000 barrels, while that of all New York is placed at about 2,000,000 barrels of 300 pounds each, the spot value of which is about \$1.10 per barrel. The following are the analyses of the Rosendale cements, which although consisting essentially of the silicates of lime, magnesia and alumina, differ materially in their relative proportions:

MATERIALS.		
	Lafarge's Rosendale manufactured by the Rosendale Cement Co.	Portland cement manufactured by the Lafarge Cement Co.
Silica.....	22.77	17.17
Lime.....	34.54	48.28
Magnesia.....	21.85	19.13
Oxide of iron and alumina.....	10.43	10.50
Manganese oxide.....	.37	Trace.
Soda.....	2.28	Trace.
Potash.....	1.35	Trace.
Carbonic acid.....	2.84	3.38
Phosphoric acid.....	.19	
Sulphuric acid.....	1.44	1.20
Water.....	1.59	
Totals.....	99.65	99.96

Beside the natural (Rosendale) cements manufactured in this locality, a small amount of Portland cement is made here.

The second cement-producing locality, in point of importance, is in Kentucky and Indiana, in the neighborhood of the falls of the Ohio. The product is known as the Louisville cement, from the principal center of its production. This is also a natural cement.

Both natural and artificial cements are manufactured to a considerable extent at Allentown, Pennsylvania. Cement is also reported as being manufactured at the following points in the eastern States in a greater or less quantity: Akron and Buffalo, New York; Sandusky, Ohio; Utica, Illinois; Kensington, Connecticut; Cumberland and Round Top, Maryland; Shepherdstown, West Virginia; James River, Virginia; Rockland, Maine; in western Pennsylvania, and at South Bend, Indiana, where small amounts of Portland cement are produced.

Our main supply of Portland and other artificial cements is imported from abroad. There are many varieties of imported Portland differing among themselves in the proportion of their constituents, and in their characteristics of tenacity, strength and hydraulic qualities. Generally speaking, imported Portland cement is manufactured from 60 per cent. of chalk, 30 per cent. of alumina, free of organic matter, and 10 per cent. of silica. Until within a few years all our supply of Portland cement came from England. Recently, however, German importations have assumed great importance, and bid fair to hold a large proportion of the market in the near future. This material is also imported in considerable quantity from Sweden and other Scandinavian countries, and from France. The following is, in brief, a history of the importations from different countries: From 1871 to 1876, practically all importations were from England. From 1876 to 1880, the importations were largely from England, with a gradual encroachment from Germany; while in 1882 the importations from England formed one-half the total amount brought to this country. Three-fourths of the other half were brought from Germany, while the remaining one-eighth came from Sweden, France, and the Netherlands.

The following table gives the total importations during the fiscal years named:

Years.	Quantities, bbls.	Values.
1878.....	92,000	\$184,086
1879.....	106,000	212,719
1880.....	187,000	373,263
1881.....	221,000	441,512
1882.....	337,793	675,587

The values given are based on manufacturers' prices; 40 per cent should be added to bring them up to the prices in this country. The new tariff rate on building cements of all kinds is 20 per centum ad valorem.

Roman cement has been imported almost entirely from Glasgow and London. Of late years the importation of this cement has largely decreased. Lime of Teil is imported mainly from France. The importation of this, Keene's and other cements is comparatively trifling.

Portland, Rosendale and Louisville cements are used primarily for work under water and in all cases where great strength and tenacity are required, as in the foundations of heavy buildings, seawalls, light-houses, bridges, sewers, etc. Portland is used very extensively, also, for cellar floors, sidewalks, and the manufacture of artificial stone. In general it may safely be said that imported Portland possesses a higher degree of tenacity and greater resistance to crushing than other cements, although there may be some American Portland which equals it in these qualities. The great difference in price between the imported and the American Portland on the one hand and the natural American cement on the other illustrates this difference in quality. Roman cement is characterized by setting much more quickly than Portland or American cements, and is hence used for such purposes as repairing leaks, and such minor uses. Keene's is used for the manufacture of imitation marbles, ceilings, cornices, etc. Lime of Teil seems to be of very limited application, and is used mainly in admixture with Portland cements.

While the amount of the importations is increasing with great rapidity, the amount of cement of domestic manufacture is increasing doubtless in an equal ratio. This increased demand, which is largely in excess of the increase in building, is explained by manufacturers and importers as being due to the fact that cement is rapidly replacing lime mortar for ordinary uses of building, especially in large and expensive structures.

Cement in the Rocky Mountain Division.

In 1881 it was accidentally discovered that the lime burned from one of the limestone beds near Canyon City, Colorado, possessed hydraulic properties, and experiments were begun by Mr. N. M. Megrue, of Canyon, with a view to the manufacture of first-class cement. These experiments were continued with but slight success on a large scale. In 1882 works were erected at Denver, and every effort was made to secure the most favorable results. During 1882 about 100 barrels of excellent cement was made, and this was freely tested in various ways, the material satisfactorily standing every test.

Only a small proportion of the rock burned, acted satisfactorily, over 90 per cent being useless for all hydraulic purposes. These experiments have been continued until finally complete success has been achieved. In the first week in May, 1883, the first entire kiln of cement was turned out, and the company are now satisfied of their ability to produce a cement almost equal to the best Portland.

The works and experiments have cost nearly \$30,000, and the capacity is now 100 barrels of 400 pounds net per day. The relative cost of the various brands of cement in Denver is as follows:

Portland, per barrel of 375 pounds net.....	\$7.00 to \$7.50
Louisville, per barrel of 365 pounds net.....	4.00
Denver, per barrel of 400 pounds net.....	6.00

This will make the Denver and Louisville cements cost the same price, 1½ cents per pound.

The Denver cement company expect to fully supply the State of Colorado, and the Territories of Wyoming, Utah and New Mexico with a material which will make excellent and durable pavements and fulfill all the requirements of the best cement.

The Canyon City Iron, Paint and Cement Company manufactured in 1882 2,000 barrels of cement (each 300 pounds net), but its quality has not been ascertained. For the first six months of 1883 the make was 385 barrels. This cement is sold retail at \$4 per barrel.

The source of supply for both companies is the same—the Upper Silurian limestones in Hogback near Canyon city. In the same locality occur beds of infusorial lime and white silica.

Cement on the Pacific Coast.

Fully twenty years ago a bed of hydraulic limestone was opened up about one mile south from the town of Vallejo, Solano county, California, and kilns for burning and a mill for grinding it were erected near the town of Benicia. The rock occurs in seams never more than four or five feet thick, inclosed in a metamorphic sandstone. The belt containing it extends westward across the strait of Carquinez and to the northwest for a distance of ten or twelve miles, in which direction it spreads out over a breadth of several miles. Only at a few points along this belt, however, does the limestone occur in any considerable quantity. The company engaged in beneficiating this rock pay 50 cents per ton for the privilege of taking it out and appropriating it wherever found, paying from \$3 to \$5 per ton for it delivered at their works, which have capacity to turn out about

100 barrels daily. Owing to heavy importations of this commodity, these works have not always been run to their full capacity.

Several years since a bed of limestone suitable for making Roman cement was discovered in the town of Santa Cruz; but the deposit, though apparently extensive, has not as yet been much utilized.

In Oregon, and also in Washington Territory, hydraulic limestone of good quality has been found and works put up for manufacturing it into cement. The discovery of similar limestone elsewhere on the coast has been reported.

The consumption of cement in California is large, much being used in laying the foundations of buildings, for the manufacture of artificial stone, the construction of street, cable roads, dry docks, etc. The importations at the port of San Francisco during the past nine years have been as follows:

Barrels and Casks.		Barrels and Casks.	
1874.....	60,202	1879.....	15,668
1875.....	73,814	1880.....	62,417
1876.....	65,983	1881.....	65,695
1877.....	45,469	1882.....	90,208
1878.....	57,258		

Of late years a large proportion of these imports has consisted of the English Portland cement, which has succeeded, partly owing to low freights, in nearly crowding out the Eastern Rosendale, at one time extensively used. The following are present ruling prices for cement in San Francisco: California, \$2; Rosendale, \$2 75 to \$3; Portland, \$4 to \$4 50 per barrel.

Wood River Mines.

Notwithstanding the fact that very little capital has been brought into this country for the development of its mines, the growth and development of the country has been constant and rapid. In no other ledge mining section, except Leadville, has the mine-owner been able to realize money from working his property without investment in reduction machinery, to the extent that has been done on Wood River. There is no property that has been developed which has not paid for itself, and in many instances, over and over again.

The Englishmen, who recently became the owners of the famous Minnie Moore, are delighted with their purchase—and well may they be, as the developments since the sale have made that property worth twice what they paid for it. Mr. Palmer, one of the new owners in charge, is so well pleased with the country and so thoroughly confirmed in his estimate of the value of our mines, that he is seeking other investments here for himself and associates in Europe. From present appearances English capital will, before the season of 1884 is over, control the principal lead and silver producers of this region.

Numerous extensive and valuable developments have been made already this season, in the various localities from Bellevue to the Smoky. The Bullion mines have never looked so well, and shown so much ore as now. From all directions come reports of renewed activity. Except upon the summit of the highest mountains the snow is gone, and the country is green and beautiful. The summer of 1884 opens more favorably and prosperously than any season in the short history of Wood River, and there is no reason to doubt the prophecy of the *Times* that the product of the country will this year be double that or any previous year.—*Wood River Times*.

GRANITE BLOCKS IN AMALGAMATING PANS.—

A correspondent of the *Engineering and Mining Journal* says: Having for years past been a close observer of the various amalgamating appliances that have been patented and tested to sink into oblivion without a single one fulfilling the requirements, allow me to give your many readers the result of a forced experiment in this line some years since. Two of us got an old rattle-trap mill with both gold and silver tailings to work on percentage. Having little means, we found ourselves with worn-out shoes and dies for our pans. We tried in vain to get some, but failed. I next decided on dressing out granite three inches thick, and using them arastra fashion, instead of iron. The stones were uneven, and our first day's run was anything but a success. The second, however, when the granite slabs began to get properly together, told quite a different story, and the same gold rock that yielded but three dollars a ton in an iron pan, gave us eight dollars between the rocks. With the silver ores we had equally good success. For years I have been hunting abandoned or idle mills, and have got remunerative results where others have failed. I carry a diamond saw, and when a bargain is struck with a mill-owner to run his tailings, I quietly hunt suitable boulders, saw them into slabs and substitute them for iron. They are more durable than iron, cost usually about one-third, and can be had at all places and all times of the year. By putting in a bottom of the cut rocks with Portland cement, the granite will wear to a mere shell without breaking. Where gold ores are contaminated with lead as sulphides, chlorides, etc., this simple appliance gives excellent results, working fully as close to assay as a well-regulated and managed arastra. I have no doubt that others have experimented in this line, but the simplicity of the improvement is the cause of its being overlooked.

MECHANICAL PROGRESS.

Welding Cast Steel.

The welding of steel has always been considered a difficult and mysterious operation, and numerous nostrums, more or less expensive, are in the market for the purpose. A very simple plan is to use ordinary plaster of Paris, or stucco, which is found to answer perfectly. The idea was proposed some time back, but does not appear to be generally known, and it was lately rediscovered by Mr. Benjamin Askew, of Glasgow in a way which constitutes a curious incident in the history of invention. Mr. Askew had a friend who, after much labor, had discovered a composition that served to do for welding steel, and he begged Mr. Askew to try it. Mr. Askew wrote to order a cask on trial, and about a fortnight afterward he went down to the store of the works and demanded if anything of the kind had arrived. The storekeeper told him that something answering the description had indeed come in, but he believed it was common stucco, and thought he would find the invoice to prove it. Mr. Askew, however, inspected the material, decided it was what he was in search of, and carried it off. He tried to see if it would weld cast steel, and it did with the greatest ease. Triumphant he returned to the store, prepared to convince the storekeeper he had really got hold of the steel welder and found that worthy equally triumphant and flourishing an invoice which proved beyond a doubt it was stucco. Somewhat puzzled, and not unnaturally, Mr. Askew applied to his friend and found his mixture had not in fact been sent off, so he was compelled to accept the position that stucco at 3s. per ewt. would weld cast steel quite as well as patent mixtures sold at ten times the sum. He went carefully into the matter, and found that not only was the welding perfect, but that in many cases the quality was improved. Then he took a piece of steel meant for cold chisels, but too hard and brittle to hold its temper. He cut it to pieces, welded these with stucco, and drew them out into cold chisels, which were now found to be of very good quality. A committee appointed by the Scottish Society of Arts, before whom the paper was read, also investigated the matter and fully confirmed Mr. Askew's conclusions, but they drew attention to the fact that the welding of cast steel depends very much on the percentage of carbon it contains. They give the following rules on the subject:

Razor steel, 1½ per cent. carbon; easily burnt and requires skillful handling.
Saw and file temper, ¾ per cent. carbon; should not be heated above a cherry red.

Tool temper 1½ per cent. carbon; can be welded but not without care and skill.

Spindle temper, 1½ per cent. carbon; requires considerable care in welding.

Chisel temper, 1 per cent. carbon; may be welded without much difficulty.

Below this last come the various forms of medium and mild steel, which are easily weldable.

While the welding of steel may thus be said to be with difficulty overcome, the same cannot be said of another operation, very useful in ordinary engineers' practice, namely case-hardening. Experience shows that case-hardening is not possible except with the very mildest descriptions of steel, or rather iron containing not above 0.15 per cent. of carbon. An attempt to case harden steel which is beyond this limit of carbon not only fails but makes it rotten. It is very desirable that this difficulty, and also the failure of steel when welded at a black heat should be thoroughly examined and if possible corrected; otherwise there are certain purposes for which wrought iron is likely after all, to hold its ground.—*Engineering.*

A Process for Softening Iron Castings.

A revolution in the manufactured iron trade is announced from Melbourne, where two local ironfounders (Jenkins and Law) are reported to have discovered a new process in their trade. It appears that an accidental discovery was the commencement of the invention, a fragment of cast iron having been dropped while hot into a water channel, and afterwards broken, when it was observed to be soft and tenacious, instead of hard and brittle, as might have been expected. This phenomenon led to inquiry and experiments, with a view to ascertain the reason of the change. It was supposed that the temperature of the metal and the composition of the water were the principal circumstances which combined to produce the transformation, and after numerous trials the right temperature to which the iron should be brought before immersion was discovered, and also what foreign elements were required in the water. The metal is merely dipped in the bath, not steeped, the required change being physical not chemical, and the ingredients of the liquid are common and cheap.

As patented, the process is briefly as follows: The castings are run in a chill or iron mould, allowed to cool, re-heated in a furnace to a particular temperature, and then plunged into the bath. Thus treated the iron develops a close, tough and comparatively soft grain, so much like that of the average steel that, according to the Melbourne *Argus*, experienced foundries in the colony had great difficulty in believing the metal to be iron at all. By this process it is claimed that the adamant hardness of chilled

castings is removed, and further positive advantages are conferred. Time is saved by the great extension of chill castings for purposes to which their hardness formerly rendered them inapplicable. It is contended that the metal is also made much stronger, a bar that would break with a load of 1,200 pounds under the old system being capable, if made in the new way, of withstanding a strain of 1,900 pounds. Lastly, the soft, tough grain produced by the new process increases the facility of working the metal, with a corresponding diminution in the wear and tear of tools, and a finer appearance in the finished article.

WROUGHT SCRAP CASTINGS.—It will doubtless appear an anomaly to talk of castings from soft steel or wrought iron scrap. Nevertheless, such, we are informed, is the composition of some castings which we recently examined, and which were exhibited in the lobby at the recent meeting of the Iron and Steel Institute. These castings are of Swedish manufacture, being made at the Carlskrona Foundry, Stockholm. Above and beyond what we have stated as to their composition, however, there is a little secret in the manipulation, the result of which is a material embodying all the qualities of good wrought iron or mild steel. Splendid examples of castings were shown, some of which were bent cold into the most trying shapes. This material is said to contain 0.12 per cent. of carbon, to be very easy to weld, and to be practically free from blow-holes. The temper can be varied to suit requirements, and the cost is stated to be the same as that of malleable castings. The quality, however, being greatly superior, renders the new material useful for purposes to which malleable castings could not be applied, owing to their want of perfect reliability. The inventor is Mr. C. Wittenstrom, a Swede, and the matter is in the hands of Mr. Nordenfjelt, of 53 Parliament street, Westminster. Other things being equal, these castings have a wide field of usefulness before them.—*Iron.*

A WIRE PLATING MACHINE.—The Springfield *Republican* tells of a machine that is attracting much attention, just finished, after over seven months' work, and run for an hour or two's exhibition recently at Westfield. It is designed for plating wire with the same facility and ease that the ordinary whip machine plates thread covers on whips, and is to be used for making wire pillows and mattresses for a Philadelphia medical firm. The machine covers a good deal of territory, being 53 feet circumference and 16½ feet across. It has 300 gears and 200 "racers," each of the latter carrying a wire thread. The ordinary plating machine runs only 50 racers, but one has recently been built of 140 racers. This wire plating machine is the largest thing of the kind, and much interest has been felt in its success. It proved perfect in every respect when first started, and as soon as a platform can be arranged over it for the operator's use it will be started regularly.

TEMPERING HAMMERS.—A correspondent of the *Blacksmith and Wheelwright* says: Tempering a hammer is a job that a great many men can not do as it should be done. I was that way myself until last winter when, while traveling in Iowa, I learned from the foreman of a shop there the following method of tempering. After the hammer has been dressed in good shape and everything is ready to temper, get an old coffee pot or some vessel with a small spout attached; heat your hammer to an ordinary heat, and holding it over the spout tub, pour water from the coffee-pot spout into the center of the face until cold. This hardens the center to a greater depth than it can be hardened by plunging the whole face of the hammer into the tub in the ordinary way. The temper can afterward be drawn on the edges.

LOCOMOTIVE LINKS.—Thirty years ago, says *The Blacksmith*, links for locomotives were made of scrap taken anyhow; they were case-hardened. They were all finished previous to hardening, of course, and the slot was of all widths and the surfaces winding in all directions. In such cases they had to be put under a screw-press, and straightened and ground with emery to make them uniform. Once right they wore almost indefinitely without needing repair. Scrap forgings, made of best selected material, are better for shafts than the best cast iron, which has its place only where slow-running shafts, without jar, can be used.

THE MALLEABILITY OF CAST IRON is secured by the abstraction of some of its carbon. As oxidizing agents, to remove the carbon, may be employed, oxide of zinc, anvil scales and brown and red hematites. The iron to be treated is placed upon a bed of such material, the space between the castings being filled up with the same; the whole is then exposed to a red heat in the oven or furnace from 24 to 96 hours. A raw material containing but little manganese and graphite carbon should be used. White pig iron answers well. Malleable cast iron is easily filed and polished, and may be forged at a red heat.—*Sawing Machine News.*

COPPER FOR ROOFING.—It is thought that the decline in the price of copper makes it probable that it will be used as roofing, among other new purposes. It does not require to be painted, like the tin roof, every two or three years, and it is not subject to rust. Even at present prices, though a copper roof might cost two or three times as much as a tin roof, in the end it would be much less expensive.

SCIENTIFIC PROGRESS.

An Important Telegraphic Invention.

At the meeting of the Royal Scientific Society of Canada, opened at Ottawa May 20th and ending May 23d, among other papers presented was a very important one prepared by Mr. F. N. Gisborne, the superintendent of the government telegraph service, in which that gentleman described a new system which he had devised to obviate the evil effect of electrical induction in underground and aerial conductors. A number of diagrams were presented, illustrating the conditions obtained in neighboring circuits; and two or more circuits arranged in the ordinary way, and the same arranged according to his method, were compared. The advantages of the latter arrangement were clearly set forth by a series of experiments made with a section of cable about three thousand feet in length, constructed under his direction, and laid underground between two of the departmental buildings in Ottawa. The cable contains twenty indifferently insulated conductors or wires, which are divided into pairs, two conductors being twisted together in each case. Each pair constituted a metallic circuit, one conductor being used as a "return," instead of the earth plates usually employed. The peculiarity of the invention consists in the twisting of these metallic circuit conductors, as both wires are thus made to occupy an equidistant relationship with respect to any other conductor or pair of conductors in their vicinity. It was explained, that, by this device, a current introduced into a circuit is conducted down one wire, and up the other; and, the position of both wires being the same with respect to neighboring circuits, the inductive effect of the current passing down one wire is neutralized by the inductive effect of the same current passing up the return wire.

It was also theoretically demonstrated that the twisting of the wires of the metallic circuits lessens the effect of introduction of the current upon itself. When the wire of a metallic circuit are laid parallel throughout, the current induced from one wire into the other is in the same direction as the current itself passing in that wire. The effect of the current is therefore prolonged, and retardation experienced in a marked degree, whereas when the wires are twisted closely (say, two turns to the inch) the wires occupy throughout their length a position approaching right-angles with respect to each other, and the induced currents are thereby materially lessened, and retardation rendered less appreciable.

In the discussion which followed the reading of the paper, it transpired that if a conductor were enclosed and insulated within another conductor (as a gutta-percha covered wire drawn through a metal tube), and both conductors were connected at either end so as to form two independent closed circuits, the enclosed conductor might be employed to conduct electrical currents, without any inductive effort being perceived, in a circuit extending parallel with, or in the neighborhood of, the outside conductor. The explanation of this condition is that the outside conductor, which in this case cannot be used as a medium for communication, intercepts the induced currents on all sides of the inducing circuit, and its closed circuit absorbs them. This system, however, could not be made practicable on account of its bulkiness and large first cost.

Mr. Gisborne's construction is much cheaper, and all the conductors form an integral part of the communicating circuits, so that space and expense is economized to the fullest extent. A good deal of interest was manifested in Mr. Gisborne's invention.

[Why could not Mr. G.'s twisted wires be bunched together, with a proper insulating medium, enclosed in iron pipe, and placed underground, for city service, etc.? Would not the twisted wires obviate the trouble of induction which now presents so great an objection to any system of underground wires hitherto devised?—*Eds. Press.*]

THE PLANET SATURN, which has for a long time formed such a conspicuous object in the western sky, until quite recently, has now been lost to sight on account of its apparent near approach to the sun; but it will soon show itself quite as conspicuously as a morning star. It is now at its nearest approach to the earth, and its rings stand at an angle at which they can be best seen and studied. Many important observations have already been made and noted in these columns. A recent number of the *Comptes rendus* contains an account of some very remarkable observations of this planet and Uranus, made by Thollon, Perrotin and Loewyer, at the Nice Observatory, under an extraordinarily favorable condition of the atmosphere. On March 16th the outer of the three rings of Saturn was seen to be made up of three separate rings, of slightly greater breadth toward the ball of the planet; and all of these rings appeared at times to be marked with striae, as if there were indefinite subdivisions. Uranus was observed under similar conditions on March 18th, and its general appearance is described as similar to that of Mars; that is, dark spots near the central portions of the disk, and on the limb of the planet, at position angle 38°, a white spot resembling that seen at the Martial poles. The observers, having taken

care to eliminate a possible deception by the position of their instrument, also recorded a difference of tint of the two hemispheres—dark toward the northwest and toward the southeast bluish white.

ORIGIN OF CRYSTALLINE ROCKS. Dr. G. Sterry Hart, in a paper read before the late meeting of the Royal Society of Canada maintained, in opposition to the plutonic and metamorphic hypotheses of the origin of these rocks, a new one, designated the *crinitic* hypothesis (Greek, "krene" a spring), according to which they were formed, at an early period of the earth's history, by the agency of circulating subterranean waters rising to the earth's surface as springs. He supposes the previous existence of a chaotic layer, the last-congealed portion of a globe consolidating from the centre: which layer, rendered porous, and permeated by waters, gave up to them the materials of quartz and the felspars, after the manner of zeolites, to be deposited at the surface. The action of non-aluminous silicates, allied to pectolite or the magnesium salts in sea-water, was the source of serpentine, pyroxene, etc. The gradual removal by solution from below, of vast quantities of material, and the resulting contraction of the primitive stratum, caused the universal corrugations of the upper acidic or gneissic layer. From the undissolved basic residual portion have come such eruptive rocks as melaphyres and basalts, while granitic and trachytic rocks are softened and displaced portions of the acidic or secondary layer. The author has developed at length this hypothesis, which, according to him, affords a satisfactory explanation of many hitherto unsolved problems in geology.

THE DAVY LAMP.—The philosophy of the safety lamp is best explained by its inventor, Sir Humphrey Davy, who describes it thus: "The principle of my lamp then is that the flame by being supplied with only a limited quantity of air, should produce such a quantity of azotic, or carbonic acid gas, as to prevent the explosion of the fire damp, and which, from the nature of its operations, should be rendered unable to communicate any explosion to the outer air." The surrounding gauze when of a certain mesh, and kept cool, prevents the flame inside the cylinder from coming in contact with the outer gas. The wire gauze should not be more than one twentieth of an inch square. Wire from one-fortieth to one sixtieth of an inch is the most convenient size, and there should be 28 wires or 784 apertures per square inch. The cylinder must have a double top and a diameter of two inches; the object being to prevent too much gas from accumulating inside the lamp and at the same time making it more secure to withstand an explosion.

THE MAGNETIC POLARITY OF IRON. Captain John Hayden, of Bath, Me., author of "The Requisite Nautical Assistant," writes us that as long as forty years ago he practically tested, on shipboard, the influence of upright iron bars or masses of iron on the needle. He says: "Iron rods or bars, in a horizontal position, exert but little force on the compass, but the same amount and form of iron placed vertically produce an immense effect on the needle. The iron rod immediately becomes magnetic when placed in a vertical position, its magnetism increasing with the length of time it so remains, although it manifests no magnetism when parallel with the horizon. This effect on iron is most marked when the rod is held or placed in the magnetic meridian, and in the direction of the tipping needle, which is in this country with the bottom end swung to the north about thirty degrees from the perpendicular."

NEW AND RARE MINERALS.—Colorado has proved itself most rich in new and rare minerals. The latest report in this direction, is from Mr. Hillebrand, who, according to a note in *Science* has recently been busy with the chemical examination of rocks from the Silver-Cliff district. He has proved the existence, at this locality, of several minerals not hitherto known to occur in North America. The results of his examinations also point to the existence, in one of these minerals, of silver in a very rare form, if, indeed, not in a combination hitherto unknown in the mineral kingdom. In March, eleven rock specimens were analyzed, and a number of interesting minerals from Ouray, Col. (some of them probably new to science), were examined.

A NEW TEXTILE PLANT, which received the name "kappe," is attracting considerable attention in Europe. It was first publicly exhibited last year at the Amsterdam Exhibition. It is indigenous to Java; and, when its fibres are carefully prepared, they resemble wool, and, when curled, at a moderate cost they can be used for stuffing mattresses. It can also be spun and dyed; but the fibrous appearance it retains shows that a radical improvement in the method of treating it has still to be discovered. All who examined the fibre at Amsterdam were satisfied of its contingent improvement as a textile material.

INTERESTING BOTANICAL COLLECTION.—It is claimed that the Missouri Botanical Gardens near St. Louis, have a complete collection of living specimens of all the plants mentioned in the Bible.



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SAN FRANCISCO:

Staturday Morning, June 28, 1884.

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Passing Events.

THE PRESS ends its forty-seventh volume with this issue, an event which we hope our readers will note as it indicates our attainment of a newspaper age representing experience and vigor.

Aside from what we have noted in our usual mining summary there is nothing special to record from the mining regions. The differences between mine owners and miners in Tombstone Arizona still continues, much to the detriment of the camps.

Along the Southern Pacific in this State there have been washouts, and consequent delays, a very anomalous state of affairs at this season in California for what is usually considered a dry region. Floods are recorded also on the Tule islands, due to the swollen state of the rivers. The rain has done damage in some places. The miners are only sorry they can not utilize the abundance of water now flowing.

GOLD HILL MINERS' UNION ELECTION.—The Gold Hill Miners' Union has elected the following officers to serve for the ensuing six months: President, D. A. Curran; Vice President, J. H. McDonald; Recording Secretary, F. L. Clark; Financial Secretary, Thomas Riley; Treasurer, James Quirk; Warden, William Dyce; Conductor, Joseph Fox; Finance Committee—John McGinnis, Sr., John Walters and Edward McGinnis; Trustees—T. R. Fraser, Samuel Hoge, E. O. Leermo, Al. Joy and M. Deegan.

Close of the Volume.

This number of the MINING AND SCIENTIFIC PRESS is the last one of Volume XLVII, and concludes the twenty-fourth year of the publication. Any newspaper which has been published continuously for that many years must have attained a standing beyond question; and more especially is this the case where the publication is a technical one. For all these years has the MINING AND SCIENTIFIC PRESS been the representative of the mining and industrial classes of this coast. It has seen most of the "excitements" begin and end; recorded their discovery, progress and decadence. It has always been the friend of the miner, mechanic, and others of the progressive and industrial classes of the Pacific coast. That its efforts have been appreciated and its mission recognized is abundantly shown by its circulation and its advertising patronage.

The PRESS has not confined itself to the one subject of mining, but has kept track of mechanical and scientific progress, bringing to its readers each week the freshest news of advance in these lines. Illustrations of machinery and mechanical appliances of general interest have been presented, and all those things of special interest on this coast have been described and pictured.

The PRESS has always made a specialty of keeping track of all new and improved metallurgical processes and appliances, and all mining improvements and systems. It has brought all these things before its readers in an intelligent manner, so that they might keep properly posted on all that pertains to their business in every-day life. The current news from various mining regions and districts in California, Nevada, Arizona, New Mexico, Colorado, Utah, Idaho, Montana, Oregon, Washington and elsewhere, has been carefully collected and condensed each week in such a manner as to present clearly the salient facts in as brief a form as possible. Where regions have had a special attraction, suitable prominence has been given them, and everything relating to new discoveries in new fields has been put before the readers.

With all these years of experience the publishers and editors feel that they know pretty well what class of matter the readers of the PRESS want, and in its selection and preparation due diligence and care has been exercised. The present volume has been specially replete with information concerning mineral substances of commercial importance.

The copious index on the last page of the volume will indicate how wide a range of topics has been treated, and will afford an opportunity to the many who file and bind their papers to hunt up any desired subject without trouble.

The publishers have spared no trouble or expense to make the PRESS of interest and value to its subscribers. They propose to continue to do this, and when improvement is possible it will be made. In coming numbers will be found a great deal of value to the mining and mechanical engineers, as well as to miners, millmen, mechanics and others. As we progress here we find that professional men are more willing their experiences should be known, and as more of them become writers there is a larger fund of valuable experience from which to draw. The PRESS has now many readers, but more will be welcome, and with their increase its field of usefulness is widened.

AN OLD TUNNEL.—Tunneling through the Alps is not altogether a modern idea. As early as 1400 the passes over the Alps into northern Italy formed a serious obstruction to travel and commerce, and entailed a heavy expense upon the inhabitants of the valleys upon either side of the Alps. Negotiations were instituted in 1472 between Louis XI, King of France, and some of the mountain authorities, by which a tunnel should be constructed to facilitate travel and commerce over Mont Viso, and between the valleys of the Po and Queyras. This tunnel was first opened for traffic in 1480—a little over 400 years ago—at a cost of 12,000 florins. The tunnel was six and a half feet in height by eight in width. It is now about 250 feet in length, but it is stated that in consequence of frequent land-slides the openings have gradually receded fully 250 feet, so that it must have been originally about 500 feet in length. This tunnel has been frequently blocked, and even walled up with solid masonry, during times of war. It was last cleared out and made passable by order of Napoleon I, since which time it has been constantly open for traffic.

Utilizing Small Coal.

Although in this country not very much has been done in utilizing small coal for fuel by making it into bricks, on the Continent the system is largely practiced. In France, Belgium and other countries, there is not so much waste as with us; but where the small coal is not converted into coke, it is manufactured into "briquettes" or blocks of compressed fuel, which are sold for domestic locomotive or marine consumption. In some cases the economical principal is still further carried out by utilizing the small waste cinders from the locomotives, and also from the gas works, and making them into briquettes. In some parts of France and Belgium, and where stoves or closed fires are used, briquettes made from small coal, agglomerated with clay only, are largely consumed; but with open fires, or where the briquettes are required for loco or marine consumption, they require to be made from coal, agglomerated with pitch.

In only one part of the United Kingdom has the manufacture of patent fuel made any headway—viz., South Wales. That district is exceptionally favored by its geographical position and the quality of its coal; but even there this manufacture cannot compare with that carried on in France, where at one works alone—viz., the Lorraine Patent Fuel Works, the annual production is upwards of 30,000 tons.

The expense of the process stands against it in many places. For the benefit of readers who may be unacquainted with the details of this manufacture, we may briefly explain that the ordinary "patent fuel" is made from small coal and pitch, the usual operation being as follows: After the coal and pitch have been ground and mixed in the proper proportions, this mixture is heated until the pitch becomes plastic, when the mixture is filled into moulds and subjected to a powerful pressure, by which it is consolidated into "briquettes" or blocks, the pitch holding the particles of coal together. In the ordinary method of heating, superheated steam is forced through the coal and pitch while passing through the pugmill or heater. But with steam, even when superheated, there is always some water from condensation, the pitch is not so plastic as with dry (fire) heat, and the briquettes have a tendency to "crack." In France, a considerable reduction has been effected in the necessary proportion of pitch required, by heating the coal and pitch in a horizontal pugmill or box with an open top, this pugmill being enclosed in an arched brick furnace or stove, in which are several fires playing over the coal and pitch, which is kept in motion by revolving knives or blades. This system not only makes the pitch more plastic than by using superheated steam, but the coal itself (more especially with bituminous qualities) becomes slightly plastic from the presence of the tar in the coal, thus uniting much better with the pitch. By this system, the French makers claim to be able to make their patent fuel with not more than three per cent of pitch. The objections to this system are the costliness of the furnaces, the expense of the fires for heating, and the difficulty of keeping the heat at a regular temperature.

A new dry heating apparatus has lately been introduced in England in which an ordinary blower or air compressor is used to force air through a superheating furnace, by which the temperature is raised as required. This superheater can either be fixed at the end of the boilers, thus utilizing the waste heat, or it can be fired separately. By the use of a pyrometer and an ingenious arrangement of dampers this superheater is kept at the proper temperature required; the hot air is conveyed to the pugmill, in which revolving knives keep the coal and pitch in motion, whilst by another ingenious arrangement of pipes the superheated air is forced through the coal and pitch, thus ensuring all the advantages of the French system at considerably less expense in plant and manufacture. The French Minister of Marine has pronounced these "briquettes" to be the most suitable fuel for use in the navy. On many of the leading Continental railways briquettes are almost entirely used for the locomotives.

It is reported that the Chinese miners have struck rich diggings in the Horsey country, B. C., and that white miners on Bridge creek are making an ounce a day by hand. The gold is coarse—the size of wheat grains. Great hopes are entertained at Lilloet of rich diggings.

Valuable Mines of Pyrites.

The two principal mines worked especially for the pyrites which they contain are the Rio Tinto and the San Domingo mines, in Spain. They are both copper mines. The average copper yield of the former is 2.83 per cent. We have no data as to the percentage of the copper yield of the latter. These mines are both very valuable properties. The pyrites yield of the Rio Tinto for 1883 was 1,099,973 tons, 786,000 tons of which were worked at the mine, the balance being exported mostly to England. There is a rapidly increasing demand in England for pyrites from this mine, as more valuable for their double product of sulphuric acid and copper than any which can be obtained elsewhere. So great is this demand that such additional facilities for saving the ore are being set up at the mine as will ensure an annual product of 1,500,000 after the present year. The copper yield of this mine in 1883 was 12,295 tons. The percentage of this mineral is rapidly increasing as depth in the mine is reached, and it is confidently expected that the yield of copper for 1885 will reach fully 20,000 tons. An enormous amount of money has been expended in opening up this mine and in constructing the large plant required to utilize its product. The present mortgage debt of the company is \$12,260,000. The original capital of the company was \$16,250,000, divided into 325,000 shares, at \$50 each, the present market value of which is \$100, or double the original par value. The net product of the mine for 1883 was \$2,248,290, which will be largely increased hereafter by the greater yield of ore which can be raised as soon as the additions to the plant now in progress are completed. The title of the mine was derived from the Spanish government, and the company has in its waste heaps, accumulated under government working, copper, estimated at 42,000 tons, which is being gradually worked over by the company.

The San Domingo mine is small, when compared with its great rival, the Rio Tinto. Still, since the formation of the present company in 1878, it has paid in dividends \$5,475,040, the returns never being less than ten per cent on the capital stock, and going as high as 25 per cent in 1880. This mine produced 382,530 tons of pyrites in 1883, about one-third of which was shipped.

The Tharsis is another quite famous pyrites mine of Spain. In 1882 it shipped 212,218 tons of pyrites, 5,534 tons of precipitate, and 184,059 tons of iron ore, and yielded a profit of \$1,678,380. The Tharsis Company is exceptionally well situated in having no trouble in marketing its pyrites, some of the greatest alkali manufacturers being among its customers.

A CHILE COPPER MINE.—The Puncallillo Copper Co., is one of the few public companies working Chile copper properties. From the late annual report of this mine we learn 57,864 tons of ore were worked during the year producing 6,272 tons of segalas, containing, 2,924 tons of pure copper, a yield of about five per cent from the ore. The cost of producing the segalas was \$840,498, receipts for sale of same \$1,077,018, leaving a net profit of \$235,519. During the past three years, the company has paid \$825,000 dividends on \$1,000,000 capital, has wiped out an indebtedness of \$337,575, and has \$50,000 undivided profits in the treasury. The company is making efforts to reduce the cost by the introduction of crushing and rock-drilling machinery, so that, notwithstanding the low grade of the ore, the high price of fuel, and the low price of copper, it may be able to hold its own.

GOLD IN EGYPT.—An Egyptian correspondent of the London Times writes that for many years past it has been known that large sums of gold are lying hid in Egypt. It is calculated that about \$200,000,000 in bullion has from time to time been imported into the country. About \$30,000,000 of this is in circulation, and it has recently transpired that during the Vice Royalty of Ismail Pasha another \$30,000,000 was secretly transported to Constantinople. This leaves \$140,000,000 unaccounted for, and this sum must either have been absorbed in the gold ornaments of the country or must be hidden away. Should good government bring peace and security to Egypt, this, or a considerable portion of this sum, will return into circulation and assist in the development of the country.

There has been great destruction by floods in Lincoln county, Nev.

Cable Railroads Abroad.

On the 29th of last month the Highgate-Hill Cable Railroad, in London, was opened for public traffic by the Lord Mayor, M.P., who was accompanied by Alderman Sir Robert Carden, M.P., and Sheriff Cowan, in the presence of thousands of spectators. Especial interest was attached to the opening of this line by scientific men, engineers, and others, including the directors and shareholders in the two companies connected with the work, as it is the first cable tramway line constructed in Europe, and is expected to lead to a general adoption of the system in England and on the Continent. In speaking of the opening, the *London Times* says:

"J. L. Robinson, the General Manager of the Patent Cable Tramway Corporation, who have constructed the line for the Highgate Steep Grade Tramways Company, read an address to the Lord Mayor, thanking him for having consented to perform the inaugural ceremony, and pointing out that although this was the first cable tramway constructed in the United Kingdom, the system was not an untried one, having been for more than ten years in successful working in the United States, and that even the colony of New Zealand had outstripped the mother country in securing the advantages of this system of tramway working, upon the inventions of Mr. Hallidie, Mr. Eppelsheimer and others. In the construction of the Highgate cable tramway, which had been carried out on the best and most improved fashion, the directors had throughout had the benefit of the personal supervision of Mr. Eppelsheimer, one of the original inventors. Over a considerable part of the line there was only a single line of rails, which had rendered considerable mechanical skill necessary to adjust the cable in relation to the "grips" upon the cars, so that they might be made successfully to run up and down the line at will. The gradients on this line were not so steep as those found on cable tramway lines in San Francisco, the steepest here being one in eleven, while one in four and one-half had been successfully worked in the American city; but, as affording illustration of the use of the system on a moderate steep gradient, and on curves on a single line, the Highgate line offered to all interested a most useful and instructive example of its capabilities. A procession of half a dozen cars, laden with various gentlemen interested in the day's proceedings, then ran up the hill. Having inspected the stationary engines and other machinery by which the cable is worked, the Lord Mayor declared the line open for public traffic. His Lordship and a large number of invited guests then proceeded to Fairseat, Highgate-Hill, where, by permission of Sir Sydney H. Waterlow, M.P., a *dejeuner* was provided in a marquee on the lawn, over which Sir John Marcus Stewart presided."

This cable road is about the same length as the original Clay street, that is, from Kearney to Leavenworth. With the exception of the length and the grade, which is about 236 feet in the whole length, it is quite different in other respects. Where the Clay street is straight the Highgate road has only about three straight places in it,—one at each end and one where the single line joins the double—about one-third being single and two-thirds double line. There are no level crossings as on Clay street. All stoppages except at the termini are on a grade. The road being sinuous and made up of reverse curves—both the double and single portions—it required much study combined with previous experience to so arrange the direction of the cable in its running and the sheaves which supported and directed it that the curves in both directions could be safely passed and the cable would return to its proper position on the sheaves when a car had passed. Of a necessity a grip had to be constructed especially for this as well as an entirely new arrangement of carrying sheaves.

San Francisco may be proud that one of the oldest cities has not only adopted the ideas of one of the youngest but has utilized the brains of the young city in putting these ideas into practical use. No more difficult locality could have been selected for the purpose of testing this system of railway propulsion than Highgate Hill, and its success will beget many like enterprises in England and on the Continent.

This road commences at the Archway Tavern where the North Metropolitan Tramway cars stop and several omnibus lines also end at this point, as Highgate Hill is too steep for omnibuses or tram cars. This leads up to the old north gate where stands the Gate House Tavern which still maintains a well deserved reputation for its chops and steaks. From this gate there is a charming walk to Hampstead along Caen wood, passing the "Spaniards" the "Pull and Bush" and "Jack Straws Castle," where refreshments for the inner man may be

had, and this new convenience will give many an opportunity to reach a high equal to "St. Paul's" without a wearisome climb. It may be interesting to know that Sir Sydney Waterlow at whose place "Fairseat" a *dejeuner* was provided, married a Miss Hamilton from California, and has taken himself much interest in the construction of this the initial cable road in Europe. "Fairseat" is just opposite the junction of the double and single line of the Highgate Hill Tramway and no more kindly courtesy could be extended than the hospitality of this generous owner.

This road was surveyed and the system of running the cables planned and arranged by Mr. W. W. Hanscom, M. E., of this city, who went to London for that purpose in 1882, and returned last year. The cable is carried around the curves in a different manner from any other cable roads, and is the result of Mr. Hanscom's experience and study in cable railway construction. These features are incorporated in the patents which Mr. Hanscom has lately patented in the United States, and which were patented in England in 1883. The direct construction of the Highgate line has been under the supervision of Mr. Wm. Eppelsheimer the

Inspection of Explosives.

In Great Britain they have Government inspectors of explosives, and they keep a pretty sharp look-out on the powder factories. The inspectors have just issued their report for last year. The inspectors remark that the year has been conspicuous for the numerous and very serious outrages on the public peace by means of explosives which have been effected or attempted. These disturbances have resulted in two material modifications of the law relating to explosives. The most important of these modifications consisted in the passing, on the 10th of April, of the Explosives Substances Act, 1883. In regard to the general operation of the Act of 1875, it is stated as the result of at least one inspection of every factory and magazine which is in active use in the kingdom, that the level of these establishments has, on the whole, been substantially raised. There has not been any retrogression on the part of those factories and magazines, now happily numerous, where a satisfactory standard of discipline, order, and cleanliness, had been already attained, while in other establishments which have hitherto fallen short of the full requirements of the Act, very marked progress has frequently been made, and there is generally a greater disposition to recognize the advantages of that

with 2,045 in 1880 and 1,973 in 1878. According to the returns furnished by the local authorities, in 1883, the number of registered premises in the United Kingdom on the 1st of April 1883, was as follows: England and Wales 16,958, Scotland 1,742, Ireland 686—in all, 19,386. This total shows a considerable increase on the number returned in 1880—viz., 15,669 and still greater as compared with the 1878 return—viz., 13,152. The inspectors have during the year devoted a good deal of attention to registered premises, and have succeeded in inspecting as many as 319 of these places, which is considerably in excess of the number inspected in any previous year. The result of these inspections, taken as a whole, cannot be regarded as satisfactory. The visits have continually disclosed the very gravest neglect on the part of the occupiers of registered premises even to inform themselves as to the law affecting their business, and a still more widespread neglect to observe it. And the prominent cause of this negligence in a matter which so nearly affects the public safety is plainly, the inspectors say, the want of energy on the part of the local authorities in their administration of the law affecting these places. The number of accidents by explosion and fire of which this department has had cognisance during the year was 172, causing, so far as is known, 39 deaths and injuring 109 persons.

The Champion Hand Drills.

A new hand drill, called the Champion, is now being put on the market here, which is quite a cheap and practical machine, and will enable one man to do a great deal of work in a day. It is, in fact, modeled after the power drills, the piston being drawn back by cams, and thrown forward by a spiral spring, so as to give a direct blow with the drill, instead of striking with a hammer. The drill has a throw of two inches, strikes 150 blows and upwards per minute, and is turned easily with one hand and fed forward with the other. An extra crank can be attached, allowing two men to work if desirable. It is attached firmly to a column, and may be worked at any angle up or down that is desired. The whole machine does not weigh over 150 pounds, including the fly-wheel and column. There are very few pieces of mechanism, the whole being compact and strong.

The engraving given herewith shows the drill. A sectional view also shows the position of spring with relation to the drill bar.

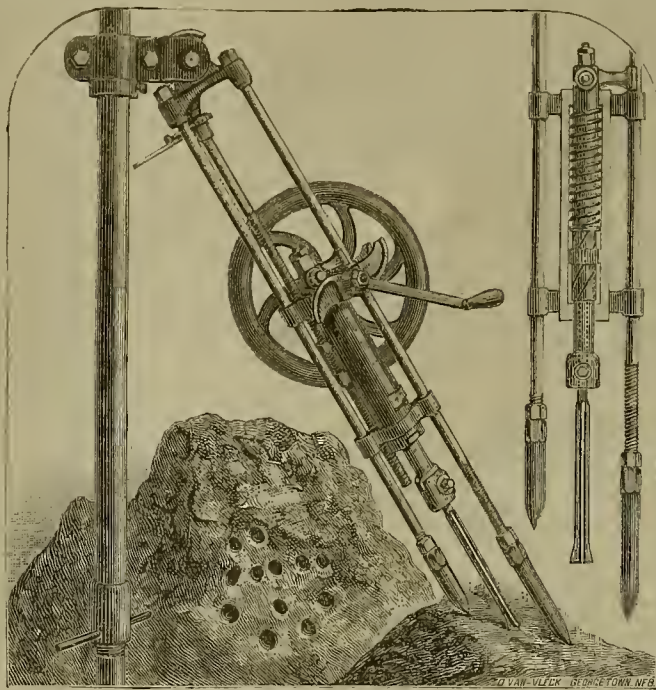
From the circular of the Champion Hand Drill Co., the manufacturers the following directions for operating are taken: Set the column in either horizontal or perpendicular position, as preferred, at the proper distance from the face of the rock to be drilled, then attach the machine thereto, by the clamp, at the proper point to give the desired angle or direction to the hole. Let the points or guide rods firmly in the rock and screw them to place tightly, so as to hold the machine rigid between the column and the rock. In doing this the cylinder must be first moved forward on the guide bars as far as possible to prevent the latter from spreading when the points are screwed to the place.

Next, slide the cylinder back far enough to fit the shortest drill into the clutch, and then push the drill against the face of rock and close the feed nut at the side so as to hold the drill against the rock. Attach the fly-wheel and tighten the nut that connects the clamp and cross-head and all is ready (after oiling). Care must be used in feeding up, so as to prevent the collar striking the cylinder head, and to have the cams let go immediately after the click of the ratchet. Turn steadily at about 70 or 80 revolutions per minute.

Each revolution of the drill gives 26 blows and with cross steel (4 points) reduces the rock to a fine pulp. A single bit drill may be used unless the rock is unusually hard, but four points are always best to use in drill machines of any kind. When it is necessary to clean out the hole or change the drill throw open the feed nut and draw back the cylinder. In starting a hole a large drill should be used for a few inches cutting, say an inch and a half in diameter. A hole 2 feet in depth may be run without disturbing the adjustment of the machine, but in going deeper the drill may be quickly released from the clutch and withdrawn for the purpose of cleaning the hole or replacing the drill with a longer one.

When wishing to change the spring, remove the collar from the piston and unscrew the rear cylinder head. The spring may be of any desired tension according to the rock to be worked. The heaviest ones furnished with the drill give a blow estimated at over 100 pounds, and is sufficient for the hardest rock. When the machine is not in use the feed nut should be left open to relieve the tension of the spring. Washers may be used to increase the tension when deemed advisable, by placing them between the spring and cylinder head. For setting the machine for open work, a stout wooden frame, 5 or 6 feet high and wide, can be made cheaply.

We saw one of these machines at work in the basement of Nos. 8 and 10 Pine Street, where it can be examined. It bored half an inch a minute in a dry hole in trap rock. The drill costs \$125. The cylinder is 3x14 inches; piston 12x1½ inches; guide was 3x4½ inches, long, distance between guide rods 5 inches, column, 2 inch gas pipe, weight of machine without column or fly wheel 75 pounds.



THE CHAMPION HAND DRILL.

constructing Engineer of the Clay street and Geary street roads in this city.

MOUNTAINS OF ALUM AND SULPHUR.—In the northern part of Lower California, Mexico, in the eastern part of the Cocopa mountains, bordering the Colorado desert, about fifty miles in a direct line from the Real del Castillo, and forty miles from the Colorado river, are found four mountains; two of alum, one of alum and sulphur, and one of sulphur. The mountain range is from 2,500 to 5,000 feet in height. The deposit of alum fills two of the mountains from base to summit. These immense banks of alum must be two miles in length, by one-half to one mile in width, an analysis of which shows it to be almost chemically pure. Adjoining these two is another of alum and sulphur, the latter forming about 20 per cent of the whole. Just east of this is a large mountain of almost pure sulphur. In it are found streaks, 2 to 14 inches wide, of pure alum. It is estimated that in these mountains there must be 100,000,000 tons of alum and 1,000,000 tons of sulphur. In the coast range west of San Pedro de Martis, near the coast, and about 150 miles south of the Cocopa alum deposits, there are three other mountains of alum of about the same size. The alum is not as pure as the other, but it is free from sulphur.

GOLD DISCOVERY IN NORWAY.—What promises to be an important discovery of gold was recently made near Bergen, Norway. In sinking a lode in search of copper, gold was found at the depth of about 15 fathoms. This lode is composed of quartz, calcspar and clay-slate, intermixed with sulphur and spots of copper ore. A large quantity of vein stuff has been picked out, containing nuggets and strings of gold. From an opening about 150 fathoms south of the sinking above referred to a sample is said to have been taken in which small strings of gold were seen, and upon being assayed gave a product of 13 ounces to the ton. It is believed that a great portion of the country rock will pay well.

striker attention to effective supervision, especially in matters of detail. The total number of factories (under continuing certificate and license) is now 101 (exclusive of "toy firework" factories) being an increase of four on last year, when the number stood at 100. One factory has ceased to exist during the year, and the number of new factories added has been five, making the total increase, as above stated, four. Altogether sixty-three factories have been newly licensed since the Act came into operation—viz.: eleven in 1876; seventeen in 1877; seven in 1878; eight in 1879; seven in 1880; two in 1881; six in 1882; and five in 1883. The under-mentioned explosives have been added to the licensed list:—F C Dynamite, consisting of not more than seventy-five parts by weight of thoroughly purified nitro-glycerine, uniformly mixed with twenty-five parts by weight of a preparation consisting of an infusorial earth known as "Kieselguhr" and carbonate of soda, the said preparation being sufficiently absorbent in quality when employed in the above proportions to prevent exondation of nitro glycerine. Provided that the amount of carbonate of soda present shall not exceed three parts by weight in every 100 parts by weight of the finished dynamite. Metallic blasting fuse, consisting of a pipe or tube of lead, pewter, or other suitable material, containing gunpowder in the proportion of not more than five ounces of gunpowder to every 50 feet in length of fuse. The dynamite trade has continued very active, though the almost complete suspension of manufacture in the Pembrey Factory, consequent on the serious explosions which occurred there in November, 1882, and the necessity thereby disclosed for comprehensive alteration of the system of manufacture, has left the home production of this explosive entirely in the hands of Nobel's Explosives Company Limited, who have found it necessary to extend their manufacturing facilities. The total number of magazines is now 329, being an increase of 9 on last year. Of stores (i. e., small magazines) licensed by the local authorities for quantities of explosive not exceeding 4,000 lb. of gunpowder, or half that amount of dynamite, gun-cotton and the like) the number existing on the 1st April, 1883, according to returns furnished by the local authorities, was 2,108, as compared

Alpine County Notes.

Far up in the very heart of the Sierras our State boasts of a county with attractions quite peculiar to itself. Seemingly wedged in among larger counties that have become celebrated regions of the Golden State—such as Tuolumne, the hallowed ground of the pioneer who in the early days tore up the shining ledges with his pick and shovel, dug "prospect holes" on the green hills, and witnessed the mad carousings of the swarthy Mexicans; or Calaveras, with its mammoth trees—this little highland county has been long forgotten and its resources neglected. Not wholly lost is this gem of the Sierras, for in the rocky ribs of those steep mountains are rich veins of gold and silver, undiscovered because unfrequented, and a wealth of forest which alone would develop it into one of the best counties of the State.

Alpine county is bounded by Eldorado on the north, by Amador and Calaveras on the west, Tuolumne on the south, and Mono on the east, with a strip of its northeastern boundary touching the State of Nevada. It is situated in the extreme eastern part of the State, and just south of that angle of Nevada that juts into the side of California, giving it its irregular shape. It contains 950 square miles of valuable land, the greater part of it still unexplored. Only in the vicinity of the towns along the margin of the lakes and in the mining districts is the land taken up, and therefore far in the hills, but still within comparatively easy communication with the towns, there are thousands of broad acres seemingly offering a fortune with every section, but yet unoccupied, and they are now the uncultured ranges of the sheep herders. But the time is coming when the thousands of the crowded cities will appreciate the mountain homes—if not for their pleasant situation and quietude, they will for the profit arising from the possession of them, and then we shall see the contentious emigrants pouring in and settling over all those green heights by hundreds, and the county will rank as high in abundance of wealth as the neighboring counties, whose resources have been developed.

Forests, Rivers and Valleys.

The surface is mountainous, covered with a dense growth of pine and spruce. On every highland following the billowy hillocks to the valleys, and creeping up again at the rise of mountains, these trees grow to a great size, and are magnificent specimens of timber. The highest elevations are about 10,000 feet above sea level, and then the mountains gradually sink into the foothills that border on Nevada and the great plain of California. There are several peaks of the Sierra; the highest are Silver Mt. and Round Top. The former, a few miles east of the center of Alpine county, rises above sea level to the height of 10,931 feet, and the latter, in the northern part, is about the same height.

They being formed by volcanic action, of course there is a great deal of lava in their geological composition; besides, there is quartz and granite.

In these high regions are the headwaters of the Stanislaus, Mokelumne and Carson rivers, the first two important tributaries of the San Joaquin and Sacramento rivers. They flow through deep canyons between high walls of rock; fed by numerous torrents, dashing down the steep descents, they are ever swelling, until they reach the great plain. The Stanislaus rises in the watershed, and is formed of two forks. The north fork flows northwest, and forms part of the boundary between Tuolumne and Calaveras, and the south fork flows west into Tuolumne, where the two unite ten miles north of Sonora. Thus the water supply is plentiful for mining, irrigating and manufacturing purposes. It flows through deep arroyos, down the steep declivities with a force powerful enough to move heavy machinery and, moreover, there is an exhaustless supply through all the dry months, from the summit's fountain of melting snows. In many places it, dashes over precipices, thus forming miniature cataracts, and the roar of the falling waters can be heard a long distance through the gorges.

The valleys are comparatively deep, sinking abruptly from all sides of the surrounding mountains, and having few lesser elevations, between their centers, and the great mural ranges. They are covered with heavy forests of pine, with an undergrowth of sage and chaparral, and carpeted with luxuriant growth of grass, which is tall and green through all the summer. In places where the soil is cleared of its native brush, and trees these valleys yield a fair harvest of grain. The cereals do well on the hills, too, when they are not rocky and steep. On the heights, grass also grows in rich abundance, from base to snowline, affording provision through the dry season, to thousands of sheep that migrate from the plains every year. In the south is Hermit valley, the largest in the county, and in the north is a smaller valley, but a somewhat higher one than the former. These are the two principal tracts of lowland, but besides there are many little vales, walled by solid banks of rock into the innermost heart of the mountains.

In the hollows of these grassy valleys there is a number of fresh water lakes, receiving and discharging the pure cold volumes of water from the summits and still lying tranquilly in the rich sunshine as if they were sheets of solid crystal. But the quiet ripples teem with

millions of trout, and in all the streams fish abound.

Mineral Resources.

As for minerals Alpine is indeed possessed of a treasure-hox buried beneath its soil. Gold and silver are most abundant, with slate and copper in small quantities. The gold and silver lie near the surface in ledges of metal-bearing igneous rock or quartz, and usually in the hilly regions. The veins, or leads after running some little distance on or near the upper strata gradually dip and continue on a slight incline into the hillsides, thus making it necessary to tunnel considerably where mining is extensively carried on. Hydraulic mining is convenient on account of the abundance of water, but this is not the usual method, however; blasting and vein mining being preferred as a quicker mode and because the veins are numerous.

The general geological structure of this region is somewhat varied. There is a mixture of basaltic lavas, quartz, granite with slate on the water channels. The violent upheavals and constant action of water have torn up the bedrock in many places so that the general formation can be read as from a book, on the precipitous walls of rock and in the deep canyons worn by the streams.

Climate in this county is healthful and delightful. The air is so clear that distant objects appear distinct through its pure medium and consequently it is free from all poisons and impurities. There are frosts in the early months and snow-storms in the highest portions, but the valleys are protected from heavy snows and thus they secure a more agreeable temperature. In summer the sunshine pours in golden floods over all the peaks and hollows, making it perfect spring-time here when all balmy breezes, mild sunshine and greenness have forsaken the plains below, leaving them parched and dry. The mean degree of temperature in the valleys is about 58° Fahr.

The Towns.

The county seat is Marbleville, situated in the north eastern part and one hundred miles east by north of Sacramento. It is a prosperous little place and three or four saw mills keep it lively all the year. There is some mining going on at this place but not so much as in other towns. The houses are built of pine lumber neatly painted; there are two or three stores, two hotels, a school house—but no court house as yet—and also one Odd Fellow's Lodge.

Monitor is over the summit, that is on the eastern side of the mountains. It is much like the other towns, being, perhaps, more of a business center, and it boasts above others of the publication of the Monitor *Argus*, edited by P. W. Parker. It is a sprightly little paper and considering the population has a wide circulation. There is here about the same number of stores, hotels and public buildings as in other towns. There are rich mines in this vicinity, both of gold and silver, and they keep one large quartz mill constantly in motion besides several smaller ones within the circle of a few miles. The Olympic, I X L and Isabella mines are all near Monitor and yield good paying ores. There is a great deal of tunnelling about the town.

Silver Mt. is built at an altitude of 7,000 feet above sea level, near the east base of the Sierras. There are silver mines here, and consequently the place presents an appearance quite the same as other camps. The machinery and works necessary for carrying on mining operations, quartz mills, tunnels, shafts, sluices and piles of ore indicate that good paying veins have been struck.

THE SNAKE RIVER PLACERS.—These mines are exciting so much interest at present that whatever relates to the working of them is worthy of notice. The new method of concentrating appears to be attracting most attention. It is thus described by a practical miner: "It consists of a grizzly 20 feet long and 2 feet wide. Under this is a sluice box to catch the fine gravel that falls through the grizzly, as the gravel is washed over it from the bank. The grizzly has a fall towards the river of 2 inches in 16 feet, and the sluice under it about 10 inches the other way, and conducts the fine gravel and water back to the rear end of the grizzly, where it enters a cross sluice, running at right-angles to the grizzly, and extending 10 feet to the right and left. Thus we have a sluice thirty inches wide and twenty-two feet long. This sluice is divided by partitions into four different channels, and the channels are so arranged as to conduct the fine gravel and water on to aprons. These aprons are sluice boxes, made of wood or iron. This was of the latter material, nicely placed on a wooden frame, and are sixteen feet long, eighteen inches wide, and have a fall of two inches in sixteen feet; the sides of these aprons are from four to eight inches high, to suit the ideas of the miner. In the bottom of the sluices are placed gunny sacks, held in position secured with buttons. Now, since there are four of these aprons on either side of the grizzly and running parallel to the sluice, it will be readily seen that the fine gravel which passes through the grizzly is divided into eight equal portions, one portion passing over each apron where the fine sand and gold is collected in the gunnies.—*Boise Statesman*.

RECENTLY a multitude of cut-worms invaded the twenty acre vineyard of L. H. Ormes, ten miles west of Phenix, A. T., and before anything could be done, stripped the vines of every leaf and grape.

Mineral City District.

A correspondent of the Salt Lake *Tribune* writes as follows: "You have of course heard of the new mining camp in Washington county, Idaho, known as Mineral City, and hence it will not be necessary to enter into any long description of its location. Suffice to say it is only eighteen miles from the end of the Oregon Short Line track, one-half the distance being over good wagon road, which will soon be completed over the entire distance. Not being a practical miner nor a professor in mineralogy, I will not attempt a description of the practical workings of the different claims, nor a descriptive analysis of the ores taken therefrom. All we need to know about them now is that they are rich in silver and contain gold enough to make the bullion considerably better than pure silver, as will be seen hereafter.

This, like all new silver camps where none of the claims are developed sufficiently to prove them valuable, was looked upon by men representing capital with a good deal of skepticism; while on the other hand, the miners holding the claims, believing them to be rich, were unwilling to part with them for anything short of a "fancy price." The natural consequence was that capitalists declined to invest, development has been slow, and the camp has not received the attention it deserves.

Last fall Mr. D. Hagerty, from San Francisco, visited the mines and remained there several weeks, during which time he made a careful investigation of the ores, formation and general topography of the country, and satisfied himself beyond a doubt that the precious metal was there in good paying quantities. He then completed arrangements with Messrs. Boggs & Landy of the Black Maria mine by which he was to put up a mill and work their ore at a stated price per ton. In March he had a ten stamp mill on the ground, and started it up about the 1st of April. The first six tons of ore put through the mill yielded a bar, or brick of bullion weighing thirty-five pounds, valued \$765, an average yield per ton of \$127.50, a pretty fair showing for the first batch of ore worked in the camp. The mill is now being run to its fullest capacity, and with results even more flattering than the above. Naturally they are learning something every day about treating the ore, and of course are gradually improving the results. Mr. Hagerty expects now to double the capacity of his mill before another winter sets in.

Speaking of winter let it be remembered that winter in this region is not like it is in most mining camps on the coast and work can be carried on without hindrance the entire year.

The camp has merit, which is being proven every day, and will soon assume its place in the list of leading camps on the coast. Nor is the Black Maria the only camp deserving notice. There are the Black Hawk, Daniel Boone, Jolly Traveler and a score of others which for the amount of work done on them are showing up equally as well and will no doubt show as good a record when put to the trial, and you may expect soon to hear glowing accounts of them, now that that the enterprise of Mr. Hagerty has broken the ice and proved successful.

The New Bar on Snake River.

George Little writes to the Salt Lake *Tribune* about the new bar on Snake river, below Caldwell:

On the Snake river, 10 to 15 miles west of Caldwell, some 2,500 claims have been located as placers. They prospect excellently in fine gold, in some instances showing many hundred colors to the pan, and it is estimated by experts, considering the fine water facilities and dumps, especially on the west bank of the river, that at least \$15 per day can be averaged to the man by using the grizzlies, sluices and burlaps. These mines would, without exaggeration, afford employment for a thousand men or more at present, leaving out what the future may develop. The Manhattan bar, about the richest on Snake river, with a good water right of 5,000 inches, and a 14-foot dump at river, has been thrown into a stock company. Fifty-three and one-third acres, or one-third of the 160, is offered for sale at \$5,000, including a one-third interest in the ditch, to enable the owners to open and operate the mine on a big scale. I think this is a splendid investment for any party or parties who desire to speculate in a sure thing, as it is very probable that each machine placed on the mine at a cost of, say \$300, will net a profit per day of from \$50 to \$100—not less than \$50. Now comes the fact that within two days exceedingly rich placer gold diggings have been struck three miles below Caldwell, in Boise River valley, and extend 12 miles down. Water is running over the ground, and about 100 claims have already been located, many of the locators having already commenced vigorous work. Many and astonishing discoveries are expected soon in this rich gold valley. The town, of about 500 people, is on the Oregon Short line, 146 miles west of Shoshone, and has an altitude of 2,300 feet. The country around is settled to a great extent by farmers; the soil is very rich and productive, producing all kinds of grasses, small grains, and every description of fruits in abundance. The climate is delightful the year through. There is room for thousands of farms more than we

have, the land being open to entry. Irrigating ditches are being built all over the land.

We have two schools and a fine church in town. All kinds of business is represented here, and the merchants are prosperous. Good hotels furnish board and lodging very cheaply. A branch railroad is just being commenced, leading from here to Boise City, 32 miles up the Boise river, which will materially aid our town, and give us an impetus that will carry us along to success and a large, thriving town or city.

Bodie Consolidated.

The annual meeting of the company was held last week. The attendance was specially large on account of the report that the control of the company was to be contested. The Lent faction was headed by the Secretary George W. Sessions, W. P. Willard, Will Burling, James Coddington, Archie Borland, Senator Stewart and George Ives. The interests of the opposition were looked after by Mr. Kelly of the Justice and Mr. De Greayer. On calling the roll it was ascertained that there were present in stock and proxies 72,477 shares—49,749 being the San Francisco representation and 22,628 from New York. The weakness of the opposition was apparent from the start; all the heavy San Francisco proxies and votes went to the old officers. The Nevada Bank voted through George Grant, 10,070; Dr. Fox through Mr. Gillen, 2,670; E. A. Richardson for the Bank of California, 1,205; George T. Marye & Son, 3,945; S. B. Wakefield, 455; Nat Stein for the Anglo-Californian Bank, 1,600, and W. H. King 9,377, all these were for the Lent party and the whole of the New York vote, and there was little left. The largest vote was Mr. Hofer, a Carson capitalist, with 2,500. A resolution was then offered by George Ives and seconded by Archie Borland, that all the acts, contracts, sales and disbursements made by the officers for the past year be hereby ratified and accepted—passed. The following trustees were nominated and elected by the old board, namely: W. H. King, J. L. Browne, A. Borland, G. I. Ives, Jos. Clark, W. P. Willard, Thomas Brown.

The total indebtedness of the company today, June 16, 1884, is \$4,500 and the cash in hand \$146,933 03 being equal to a net two dollars per share for all the stock issued—this is the largest bank credit of any Mining Company to-day on the Pacific Coast. At an adjourned meeting, the following officers were elected to serve for the ensuing year: W. P. Willard, President; Jos. Clark, Vice-President; G. W. Sessions, Secretary; Bank of California, Treasurer; John Kelly, Superintendent.

Acquiring Mexican Lands.

Real estate of all kinds, other than mineral lands, can be acquired by foreigners or any nationality residing and domiciled in the Republic of Mexico by the same title and under the same laws and provisions that the municipal authorities have established for Mexican citizens, with the following exceptions, viz.:

First—For a foreigner to acquire landed property within a zone of twenty (20) leagues of any boundary line, a special permit must have been previously obtained from the President of the Republic.

Second—Foreigners cannot acquire real estate within five (5) leagues from the shore line of the coast without a special decree authorizing the same.

Third—Forfeiture to real estate acquired by foreigners takes place for the following reasons and under the following conditions, viz.:

(a) Should he absent himself with his family from the country for two (2) years without a permit from the Government.

(b) All real estate so acquired is non-transferable to non alien residents either by sale or inheritance, or in any other manner with out complying with the following requirements, viz.:

The property must be sold in conformance with the laws regulating such sales and its proceeds delivered to the alien; deducting ten (10) per cent to apply to expenses incurred.

(c) Should a foreigner acquire public lands by denouncement (the extent of which in no case can exceed twenty-five hundred (2,500) hectares) he would lose his title to the said land if he does not keep one inhabitant on each two hundred hectares for four months in each year.

(d) As soon as an alien acquires real estate (landed property) he contracts the following obligations under the provisions of this law:

First—To be law-abiding; to submit to all laws enacted relating to transmission and use of said lands and to the decisions of the Court in all matters.

Second—to pay his pro rata of all taxes legally levied on landed properties.

Third—to personally contribute to the preservation of public peace and tranquillity, excepting always disturbances that arise from political revolution or civil war.

N.—Special laws govern the mineral lands and mines of the Republic.

THREE THOUSAND employees of the worsted mills at Bradford, England, have struck for higher wages. The stone masons of Bradford also struck.

ENGINEERING NOTES.

Distributing Power from Central Stations.

Mining Journal: The notion of distributing power from central stations to the workshops of small users, as they are called, is gaining ground in England, and there is an evident determination to wait no longer for the promised transmission of power by electricity. In London, there is a scheme already partly completed for supplying hydraulic power to city warehouses; and in Birmingham, there is a scheme for supplying motive power by means of compressed air that awaits the sanction of the corporation. It is calculated that the cost of the compressed air would be about the same as gas used in gas engines; but there is this advantage that the compressed air could be utilized in the engines now driven by steam. Out of two hundred and seventy small-power users who have been consulted, nearly two-thirds have expressed their readiness to take the compressed air; and if the scheme can be successfully worked, it will tend to materially reduce the smoke nuisance and the number of boilers, all of which are liable to explode. It is not altogether an easy matter to lay down a series of mains and supply compressed air to the workshops of a given district; but so much has been learned during the recent boring operations connected with the great Alpine tunnels, that it is quite possible to lay on a supply of compressed air, which could be turned on as required by means of a tap. There is one great advantage in the scheme, besides the abolition of the smoky furnace—and that is, that the "exhaust," instead of being very much of a nuisance, would assist in the ventilation of the work-rooms, and in some trades would be of special value in connection with certain processes.

UNDERGROUND TELEGRAPH WIRES.—The problem of laying telegraph wires underground is being solved. In Montreal ten wires were buried last November, and thus far have worked, it is said in a faultless manner in telegraph and telephone service. They are claimed to be equally adapted to electric light purposes. The wires, insulated with a coating of woven thread covered with wax, are laid in a wooden box two feet below the surface of the street. The bottom of the box is coated with a mixture of silica, rosin, linseed oil and paraffine boiled together, which is applied warm, but when cool becomes as hard as a stone. The wires are also drawn through the mixture, and the box, after they have been laid in it, is filled up with the material. The theory is that when the box decays and disappears the stone composition will remain and protect the wires for an indefinite period.

A TRIPLE RAILROAD CROSSING.—According to one of the railroad journals, three heavy steam railroads crossing one above another at the same spot will be one of the curious freaks of railroad construction in Pittsburgh. This coincidence, as it might be termed, is formed by the lines of the Pennsylvania railroad, the Junction railroad and the East End road all coming together in the narrowest part of a narrow valley. The Junction road will pass through a tunnel extended under the road-bed of the Pennsylvania, and the East End line will be continued over an iron bridge at the same spot. Thus, while a through passenger train may be flying eastward on the Pennsylvania road, a heavy freight train may be thundering immediately under it toward the north, and at the same moment a way accommodation train passing south in mid-air.

AN IMMENSE DAM.—A French engineer in Brazil has lately been selected to construct what will probably be, when completed, the largest dam in the world. The dam will be 940 feet long by 58 feet high, and two smaller ones will close side depressions. This work will, it is calculated, back the water over 1,500 acres, and retain 14,000,000 cubic meters of water, sufficient to provide for all the cattle of the regions during three years, and for the irrigation of 5,000 acres of flat bottom land alongside the river bed below. The rivers of Ceara flow in the wet season alone.

THE ATLANTIC AND MEDITERRANEAN CANAL.—Late reports from London say that the scheme for a canal from the Atlantic ocean to the Mediterranean sea, converting the Iberian Peninsula into an island, has been revived. A contract has been signed between the founders of the scheme and the contractors of the Suez canal for a canal capable of taking the largest vessels through. The founders have asked the French Government for a guarantee of £400,000 yearly to begin from 1889, when the works are expected to be completed.

THE NARROW GAUGE RAILROADS OF INDIA are of the extreme narrow-gauge character. On one of the principal ones the track is only twenty-four inches wide. It is said that the cars are of the same Lilliputian dimensions, being a trifle inside of five feet wide by eight in length. We have no data before us in regard to the proportion of narrow to wide gauge which has been built, or as to the width of the wide; but the annual extension of railroads there is quite important, although it has fallen off considerably during the last two years. Only 373 miles were constructed in 1883 against 726 in 1882 and 838 in 1881.

USEFUL INFORMATION.

LIGHT BRONZE. Attempts have often been made to produce bronze colors on non-metallic objects, but these have hitherto required a prior preparation of the surface, and the paint is, moreover, expensive. A cheap and effective bronze or metal-lustred paint has, however, been discovered by Mr. Septimus Furse, a decorative artist. The new paint has twelve distinct colors from red to blue, with any number of combined tints. Its metallic lustre is very striking, and it can be applied to porous, soft or hard surfaces with equal facility. Any unskilled person can apply it, as it is not thick. Wooden platters can be readily gilt by its means; furniture wood, organ-pipes, plaster of Paris statuary, or iron work of all kinds can be made to resemble the more valuable metals with one or at most two coatings. The paint is preservative as well as artistic. While upon this subject we may mention a new process of mineral painting, which has been brought out in Germany by Herr Adolph Keim, of Munich. Specimens of the work were purchased at the recent Nuremberg Art Exhibition for the Architectural Court of the South Kensington Exhibition. The work can be executed on glass, stone, tile wood or canvas, and consists in tracing the outlines on a ground kept moist by spray, and filled in with moist colors fixed by repeated spray of potash water-glass; after which carbonate of ammonia and benzine are applied to the surface.

A MACHINE HORSE CLEANER. A patent has been recently issued for a device for cleaning horses, which is described as follows: A sheet metal box, having a cover provided with a handle, has a transverse slot in the bottom. In the slot is a brush mounted on a shaft, on each end of which is a small wheel, against which rest two larger wheels, mounted on shafts journaled in the sides of the box; these shafts carry links, at the middle of which the brush shaft is journaled. The rims of the wheels are made of rubber. The cleaner is held in the same way as the common horse brush, and as it is rubbed over the animal's skin the large wheels are revolved by friction, as they project slightly from the bottom of the box. This imparts a rapid motion to the small wheels, and the revolving brush sweeps the dust, etc., into the box, from which it can be removed after the cover has been taken off.

A USE FOR PEA-PODS.—The *Baltimore Trade Journal* challenges science to tell what can be done with empty pea-pods. In decay they give out a strong alkali that destroys vegetation, so that they cannot be used as fertilizers and they have to be dumped in the Bay. Yet there must be value in them when fresh. The French people scald such pea hulls, then remove the silicious skins with which they are lined and make an edible dish of them. They contain sugar in no small amount, and probably if properly treated would be as palatable as common string beans. Perhaps in the future when this country comes down to the determination to live as cheaply as any other nation on earth, some genius will find it more to advantage to can the hulls than the peas, as cheap food for the lower classes.

A VARNISH FOR PATTERNS.—A varnish has been invented in Germany for patterns and machinery. It dries, leaving a smooth surface almost as soon as it is applied. It is thus prepared: Thirty pounds of shellac, ten pounds of Manila copal, and ten pounds of Zanzibar copal are placed in a vessel, which is heated externally by steam, and stirred during from four to six hours, after which 150 parts of the finest potato spirit are added, and the whole heated for four hours to 67 degrees. This liquid is dyed by the addition of orange color, and can then be applied as a paint on wood. When used for painting and glazing machinery it consists of 35 pounds of shellac, five pounds of Manila copal and 150 pounds of spirit.

GRAPE-SEED OIL.—In Italy grape seeds from the wineries, are utilized by the extraction of oil which they contain, which is chiefly used for illuminating purposes. The extraction is principally effected at Modena. It has also long been used for similar purposes in Germany and the Levant. Thirty-three pounds of seed yield about 13 quarts of oil (or about 18 per cent). The seeds of white grapes yield less oil than those of the dark variety, and young vines are said to be more fruitful in this respect than older ones. As to the French varieties, the Rossillar, Aube and Hernalt seeds yield 2 per cent more than Bordeaux seeds. The color is a golden yellow, and the oil loses about 25 per cent in purification.

PAPER FROM SUGAR CANE.—Paper is now made from the waste or refuse of sugar cane, after the juice has been expressed from it. The business promises to be the beginning of an important manufacturing enterprise. It will, no doubt, take rank with the recently introduced enterprise of manufacturing oil from cotton seed.

The discovery of the process of manufacturing cotton seed oil converted what was a useless into a valuable article, and added to the manufactures of New Orleans an industry which, in its production, the number of men employed and the profit, is the most important in the city. This new fiber manufacturing company may

thus mark the beginning here of a valuable and important industry. The material at its command is practically inexhaustible, and will mount up in the millions of tons. The Louisiana Fiber Company has been formed to raise a working capital of \$100,000 and erect a first-class pulp and paper mill, adapted to this new process of making paper from bagasse.

PINS AND NEEDLES. The manufacture of needles and pins constitutes one of the most important as well as flourishing industries of Germany. The 8 factories of Islerlohn alone consumed in 1882 no less than 600 tons of steel wire, employing a working force of 1,500 hands, of whom 800 are males and 700 females. The works are driven by 7 steam engines and 4 water wheels of 250 horse-power.

A LEGACY FOR AERIAL NAVIGATION EXPERIMENTS.—Charles F. Ritchel, of Bridgeport, Conn., who tried to invent a flying machine, will get \$100,000 to perfect the invention with from the estate of Maxwell, a millionaire brewer at Milwaukee, who left \$500,000 for experiments in aerial navigation, one-fifth of it being specified as for Ritchel's machine. Ritchel will begin experiments on a large scale.

A MINER'S POCKET KNIFE.—A pocket knife has been patented by Mr. George Frenkel, of Durango, Col., designed for miners' use, to facilitate the cutting and capping of a fuse. The knife has a notch in the handle case and one in the blade, the latter having a screw thread formed on its bottom to press a screw thread on the end of a fuse placed in the notch of the handle.

EXTRACT OF LEMON is prepared by exposing four ounces of the exterior rind of lemons in the air until partially dry; then bruise in a Wedgwood mortar, and add to it two quarts alcohol, and agitate until the color is extracted; then add six ounces sweet oil of lemon. If it does not become clear immediately, let it stand for a day or two, agitating occasionally. Then filter.

ARTIFICIAL MARBLE can be made by soaking plaster of Paris in a solution of alum; bake it in an oven, and then grind it to a powder. In using mix it with water, and to produce the clouds and veins stir in any dry color you wish. This will become very hard and susceptible of a high polish.

EXTRACT OF VANILLA is prepared by cutting one ounce vanilla into small pieces, and triturate with two ounces sugar to a coarse powder; put it into a percolator, pour on it diluted alcohol until one pint has run through, then mix with one pint syrup.

GOOD HEALTH.

Diphtheria Caused by Overcrowding.

Dr. J. T. Hutton, a medical practitioner in Minnesota, has had large experience in cases of diphtheria, and has made that disease a special study. He says in the *Medical Record*, that his observation has convinced him that the principal cause of this disease is overcrowding in families or neighborhoods. He summarizes as follows:

1. Diphtheria is caused by ochlesia, or crowd poison.
2. It is an emergency—"an event or combination of circumstances which calls for immediate action or remedy."
3. It is at first a local disease, resembling the animal poisons—snake bite, mad dog bite. Properly treated in this stage, it is one of the most curable of diseases.
4. It is contagious and infectious, and the poison may retain its vitality from three months to two years.
5. This poison is not identical with that of measles, croup or scarlet fever, nor is it intimately related to them.
6. Diphtheria may occur sporadically; any small overcrowded, ill-ventilated house may prove a diphtheria factory.
7. Its period of incubation is from twelve hours to several days.
8. Directly, temperature none; indirectly much. Crowding can occur in any temperature; practically it occurs most in cold weather.
9. In the local stage there is but one indication—to destroy the false membrane already formed; prevent further formation and spread. For this only two remedies are required as a rule.
10. In the stage of systemic infection there are two indications—the foregoing, and to support the system. A remedy or combination, internally, with food and stimulants meets this indication.
11. An abundance of pure air is the first requisite in treatment.
12. Being an asthenic disorder and prone to heart failure, rest in the recumbent position and warmth to the extremities assist in the cure.
13. The physicians must not only prescribe, he must administer the local treatment, when present and see to it that food and medicine are administered punctually in his absence.
14. The physician should visit severe cases three times a day; all cases at least once a day for the first nine days.
15. The physician should not despair, though called late. I have seen patients, apparently moribund, restored by fresh air and food alone. So have other observers.

In the septic or putrifactive stage the diphtheria patient can hardly be overfed or overstimulated. Many die for want of food and stimulants to tide them over, the popular notion being that sick people do not require food, especially those who manifest febrile

action. Two quarts of milk, each pint holding a fresh egg in solution, one cupful of home-made beef essence, properly seasoned, a pint of pure port wine, or half that quantity of pure brandy, form a fair skeleton of one day's rations for an adult. Food and stimulants are administered every hour.

Alcohol and the Heart Beats.

As a rule, it is well to let the processes of life in our bodies go on without noticing it, for doubtless it would make us very nervous to have the internal machinery in motion before our eyes. But to prevent people from abusing that delicate machinery, it often becomes necessary to show it; and if a person addicted to wrong indulgence is made "nervous" by the sight, it may save him from being made something far worse.

Dr. N. B. Richardson, of London, the noted physician, says he was recently able to convey a considerable amount of conviction to an intelligent scholar, by a simple experiment. The scholar was singing the praises of the "Ruddy Bumper," and saying he could not get through the day without it, when Dr. Richardson said to him:

"Will you be good enough to feel my pulse as I stand here?"

He did so. I said, "Count it carefully; what does it say?"

"Your pulse says seventy-four."

I then sat down in a chair and asked him to count it again. He did so, and said, "Your pulse has gone down to seventy."

I then lay down on the lounge, and said:

"Will you take it again?"

He replied, "Why, it is only sixty-four; what an extraordinary thing!"

I then said, "When you lie down at night, that is the way nature gives your heart rest. You know nothing about it, but that beating organ is resting to that extent; and if you reckon it up, it is a great deal of rest, because in lying down the heart is doing ten strokes less a minute. Multiply that by 60 and it is 600; multiply it by 8 hours, and within a fraction it is 5,000 strokes different; and as the heart is throwing 6 ounces of blood at every stroke, it makes a difference of 30,000 ounces of lifting during the night."

"When I lie down at night without any alcohol—that is the rest my heart gets. But when you take your wine or grog you do not allow that rest, for the influence of alcohol is to increase the number of strokes, and instead of getting this rest you put on something like 15,000 extra strokes, and the result is you rise up very seedy and unfit for the next day's work till you have taken a little more of the 'ruddy bumper' which you say is the soul of man below."

Fluids and Fat.

The removal of surplus fat from the body by appropriate means naturally forms a subject of interest to the well-to-do classes. Various modifications of solid diet having had their day, the consumption of fluids is now undergoing regulation in respect of quantity among those who find their own presence insupportable. There is something in this theory, inasmuch as liquids, merely as such, materially aid the digestion and absorption of the food with which they are taken. Again, several of the fluids in most common use are, directly or indirectly, fat forming. Thus, cocoa contains a very large proportion of fat, coffee a considerable amount along with amyloid substances, which are also represented in tea to a much smaller extent, and which readily pass by chemical decomposition into the form of fat. Beer, wine and spirit are all fattening, partly in consequence of their saccharine and starchy constituents, and partly from their tendency to hinder excretion of waste products of food, and, when acting on any but a languid frame, to hurry and to slur that methodical oxidation by the blood on which the maintenance of sound tissue depends. General opinion, we are sure, will bear us out in saying that when the solids consumed are moderate in amount and digestible, and when the fluid is merely fluid, not fatty or amyloid in its composition, and not stimulant, free drinking will not influence obesity. We can call to mind heavy drinkers of water and regular consumers of tea, moderate in diet otherwise, whose habits engendered not the slightest tendency to corpulence. We should, without hesitation, recommend their practice to the stout, and should rely for the reduction of their bulk not on any further alteration of their diet, which might easily be carried so far as to starve their more important tissues, but on the maintenance of regular and sufficient physical exercise.—*Lancet*.

A HAIR RESTORER.—One drachm of carbolic acid, six drops of oil of lavender, and two and a half ounces of olive oil, formed the prescription which proved effectual in destroying a parasitic affection of the mustache of a gentleman who consulted Dr. Geo. Thew, of London, England. The hair had fallen out in spots, but after the application of the above remedy the hair grew as thick and healthy as before the parasite had attacked it.

COW'S MILK FOR CHILDREN.—Dr. V. Poullain believes that the reason that cow's milk so often disagrees with children is to be found in the fact that cane sugar is used to sweeten it. He says that for thirty-three years he has used the sugar of milk with the best possible results.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MISCELLANEOUS.—*Ledger*, June 21: The South Spring Hill continues to move along prosperously. The present run is expected to prove the richest yet made. The ore chute is said to be opened 180 ft, and the end is not yet; probably it will extend as much further into the ground yet unprospected. The mine is recognized on all sides as a permanent one. The Gover has not been started up yet, the cause of delay we have not heard. It is gratifying to be able to state the prospects of the Amador Consolidated of Sutter creek are improving. The rock is of better grade, and should the improvements continue, a new mill will be erected ere long. We are informed that a chunk of gold worth several hundred dollars was recently picked off the dump of the big tunnel at Middle Bar. It has been thrown out by the workman as useless. This discovery is important, showing that the rich ore streaks which have made that region famous penetrate far below any shaft yet sunk. It is reported that the Bright quartz claim just outside of the town limits of Jackson, is to be started up at once.

CHEROKEE ITEMS.—North San Juan *Times*, June 21: The North Bloomfield Company are drifting in their claims (at Malakoff). The Milton Mining Co., through their agents, have been taking a glance at the lay of their ground situated near Badger Hill, for the purpose of ascertaining whether or not it will pay for working by the drifting process. All large powers move slowly, hence we presume this company will make further investigations ere they commence operations. It is said by those who are good judges that the ground will pay by the drifting process of mining, and that a prospecting run will determine the fact. In the event of the Milton Company deciding to make such a test, a boom will commence in our neighborhood that will eclipse any quartz strike that has been made here for months.

Calaveras.

WEST POINT.—Cor. Calaveras *Chronicle*, June 21: Our interests in the upper country at present consist in quartz mining, milling, and the different methods of extracting gold from its native state to a state of activity. Our resources in that respect are abundant, especially the gold bearing quartz, the ledges of which range through our hills for a distance of eight square miles, all of which, though not what may be termed large, are good enough and large enough to pay, in most cases, good dividends to their owners if properly worked. Our gravel mines are all idle, untouched as yet by the prospector or capitalist. There is one old river bed alone, which at present is covered with lava, that can be traced for 20 miles along its course by its output in gold at different points. Several fine specimens have already been found, varying from \$5 to \$50 in weight, and were nearly all smooth, proving that they came from an "old wash" thousands of years past. I expect, in course of time, that this channel alone will furnish millions in gold to our future capitalists.

MINING NOTES.—At intervals I will give a brief location, history and description of the different noted mines in the West Point Mining district, which may be of interest to a great many outside of the ring of a quartz mill. The Scorpion mine is about one mile from the village of West Point. The mine has three working shafts down on the lode, at a distance of 150 ft from each other. No. 1 shaft is down 50 ft, showing a ledge 4 ft wide which prospects \$14 per ton. No. 2 shaft is down 110 ft, showing a ledge 2½ ft wide which prospects \$30 per ton. No. 3 shaft is down about 90 ft, showing a 2½ foot ledge which prospects \$100 per ton. A level has been started at a depth of 90 ft both ways in the No. 2 shaft, showing a splendid vein of good quartz all along. The quartz is impregnated with sometimes solid sulphurets and hard to work by the free milling process, but which can easily be made harmless and the gold extracted from it by the Russell process. The Co. are now engaged in erecting furnaces and mills in this district for all base sulphureted quartz, which, if successful, will exceed our greatest expectations in the near future.

Inyo.

THE MAXIM.—Inyo *Independent*, June 20: After a run of eight or ten days the new five-stamp mill of the Maxim Company, at Crysopolis, has hung up its stamps for a short time. We are not at liberty to state the exact result of working of ores of the arastra and the Hope mines, upon which the company has been operating, but may generalize it by giving the fact that two chunks of fine gold, weighing respectively two and six pounds have been shipped. Supt. Barrie started for New York Thursday, bent on matters pertaining to the erection of larger reduction works. A force of 15 miners is at work day and night exploiting the mines and getting out ore for the next run, which will commence immediately after the mill boys get through their well-earned rest and fourth of July.

A HANDSOME BUTTON OF BULLION.—Supt. Barrie brought in a handsome button of gold bullion from the Maxim mill Thursday morning, and took it to New York with him. He left on Thursday night stage to catch the Carson bound train and goes direct to New York, and will probably be gone about three weeks.

PINE MOUNTAIN.—S. P. Roberts was in from Pine Mountain last Monday. He thinks it will yet prove to be the best mining section in Inyo county. Mr. Roberts has several tons of ore ready for shipment to some furnaces. He showed us some assays from ores at that point that went very high.

Mono.

MAY LUNDY.—Homer Mining *Index*, June 23: The May Lundy mill has been running the full ten stamps all this week, and the machinery is in excellent condition. The mill is now run entirely by water, of which there is a great surplus. Carpenters are engaged in preparing the foundation for the additional battery of five stamps. At the mine, No. 3 (lower) tunnel is being steadily advanced, in fine ore, to make room for additional stopes when needed, though for the present the old workings afford an abundant supply. Clearings are also being made for

other contemplated new work, and the mine is being opened up on a much more comprehensive scale than heretofore. The Lake View (first south extension, and same owners) is also being cleared for action, and will probably be running full handed by the end of next week. It is being opened on a transverse ridge just south of the point where many tons of high grade ore was taken from the croppings last year, the latter point being a sag where the workmen would now be in danger of interment by slides from overhanging banks of snow. A snow slide took away over 100 ft of the tramway on Tuesday last, but it was replaced and in running order next day at noon, so that practically no interruption occurred to mine, ore teams or mill. The Bryant is working as many men as the present openings will accommodate, and the pack trail from the mine down to the wagon road has been put in order for transportation of ore. Both the north and south drifts on the 130 level are in ore of high grade—some of it being extremely rich in free gold, and the entire mass being of a higher average than the ore of any other mine yet opened in the district. They will probably put on a pack train and start up the Butterfield mill next week. Work at the Gorilla mine has been retarded by snow slides occurring during the week. The upper section of the tramway was partially reburyed by one end of these slides, but not otherwise injured, and it was expected that everything would be in readiness to put a full force of men in the mine today. The new Planet mill is in place at the company's reduction works, and will probably be put on trial to-day. There is a strong probability that an extensive group of claims in this district has been sold to European capitalists, and that the new company's manager will arrive here early next week to make arrangements for starting up work. The Great Sierra tunnel, Tioga district, is still making rapid progress, and will doubtless reach the Sheepherder vein before the end of the month. The Virginia creek hydraulic is running full handed and with all the water that can be utilized.

BODIE CON.—Bodie *Free Press*, June 23: Five hundred and forty-six tons of ore were crushed at the mill during the past week. The average assay of the pulp was \$33 15, and of the tailings, \$2 75. There is no change in the ore breasts to report. South drift from winze No. 2, Vulcan vein, 306-foot level, is in 45 ft.

STANDARD CON.—There was extracted and shipped to the mill 600 tons of ore, the amalgam from which is not yet retorted. South drift No. 1, from south winze No. 2, 385-foot level, has been extended 10 ft; total length, 105 ft. The vein is about 2 ft wide. North drift No. 3, from main west crosscut is in 194 ft, 11 ft showing 3 ft of ore vein.

BULWER CON.—The south drift from the west crosscut No. 2, 500-foot level, has been extended during the week 12 ft; total length, 296 ft. The vein is about 1½ ft wide.

BODIE TUNNEL.—Advanced 16 ft on the vein in north drift, on the 200-foot level.

Modoc.

SHUT DOWN.—Cor. Adin *Argus*: The recent rains have retarded progress at Hayden hill in milling ore. Most of the mills and arastras have been compelled to shut down until the roads settle enough to enable teams to haul ore. Preston & Co. will soon have their new arastra completed and ready for work.

Nevada.

NOTES.—*Transcript*, June 21: The new hoisting and pumping works at the Little Deer creek mine are about completed, and the machinery will be started next Monday. This quartz claim has within a short time come to the front as one of the best in the district for the amount of work done. The Nevada drift mine at You Bet has about 50 men on the pay-roll and is proving profitable to the owners, the South Yuba Water and Mining Company. The Nevada was formerly worked by the hydraulic process, and although it doubtless yielded larger dividends than now, not more than half the number of men ever found work there than now do. The gravel is cemented and has to be crushed in a stamp mill the same as is done with quartz.

A GOOD INVESTMENT.—The owners of a quartz mine in this district, who recently paid between three and four thousand dollars for the property, are said to have since been offered \$20,000 for it and have refused to consider the offer. The mine referred to is one that has not until recently been heard from, but from present indications it will turn out a good deal of gold during the next few years.

RICH STRIKE.—*Herald*, June 17: A streak of very rich quartz was struck in the Merrifield mine yesterday. The rock is heavily charged with rich-looking sulphurets and shows well in free gold. A fine specimen of the ore was on exhibition at the Citizens Bank to-day. The main ledge is from two to three ft in width, but the rich streak of quartz is about 10 inches wide. We are pleased to learn of this development and hope the strike will prove to be extensive. Since Supt. Hughes took charge of the Merrifield he has worked hard to open it up, and this discovery is very gratifying to his friends as well as to himself.

LITTLE DEER CREEK MINE.—*Herald*, June 20: We learn that Marsh & Hothersall, owners of the above named quartz mine, which is situated on Little Deer creek, near Canada Hill, have refused an offer of \$20,000 for their property. A shaft has been sunk about 50 ft, and at the bottom there is a splendid ledge of quartz that averages 18 inches in width. The rock shows well in sulphurets and free gold and there is every indication that a rich mine will be developed. Hoisting works, run by a Pelton water wheel, have been erected, and the owners feel very sanguine over their prospects. A six-inch pump has just been put in. Some very rich rock was taken from this same mine years ago, but no systematic work was ever done on it.

ANOTHER RICH FIND.—*Tidings*, June 20: We learn that indefatigable Reese, who lives on Randolph Flat, has again made one of his semi-occasional rich finds. For a number of years Mr. Reese has been prospecting on Dead Man's Flat, and has on several occasions made strikes of from \$2,000 to \$10,000 by following some of the numerous stringers of quartz that abound in that famous region. Several days since Mr. Reese made a strike on one of those stringers, and from one panful of decomposed rock he washed out \$100, several panfuls each paid \$10, \$15 and \$5. The only trouble

about this is that it is not far enough away from Grass Valley to get up a boom.

Plumas.

ELIZABETHTOWN.—*Plumas National*, June 21: The Loring & Leavitt shaft is down about 100 ft, and a drift will now be pushed to the east to open the channel. The shaft is as true as a die, and solid from top to bottom. The water has not bothered them to any extent. Bedrock was struck at the depth of 78 ft. The channel is evidently to the east of them, and a very short time will show it up. Loring & Leavitt have good prospects, and they certainly deserve good pay as they are energetic and hard-working men.

FINE QUARTZ.—Mr. Jos. Hallsted, who came up from Rich gulch on Saturday brought us some specimens which will compare well with the best rock on exhibition in the cabinet. There is no doubt but that the Hallsted mine is one of the best quartz mines in Northern California, and it will prove so at no distant day. We expect to take a trip down that way before long, and will then be able to give a full description.

Sierra.

PUMPING OUT WATER.—*Sierra Tribune*, June 21: Work is progressing finely at the Marguerite mine, Loganville. The shaft has been cleared of water to the third level. About 30 men are employed at present and the force is being constantly increased. Operations on the new shaft will begin soon.

Siskiyou.

PICK AND PAN.—*Yreka Union*, June 25: Considerable excitement is prevailing in Quartz Valley over the rich strike in quartz made by George Tonkins in his lead near Mugginsville, which, rumor says, will pay \$200 per ton. Mr. Tonkins has hammered out with a hand mortar at odd times something like \$16 in the past two weeks, merely testing it. Quite a number of prospectors are investigating Oro Fino mountain this week, among who are Charley Birnbaum and Robert Small. John Miller & Company, near Hawkinsville, have cleaned up their diggings for the present by the use of free water from their Greenhorn ditch, and we are informed have divided a good dividend among the shareholders. They expect to commence work again as soon as the water reaches them through the big ditch. Wm. Booth has quite a piece of ground stripped and is ready for washing pay dirt when water reaches his valuable claim. Kittlewood and company on the Klamath, below the mouth of Scott river, have several cribs in and will soon be ready to go to work. Mapleson, below the mouth of Scott river, has secured all the material necessary for the construction of wing dams and is getting ready to put them in. Mr. Dan Caldwell informs us that the miners around Hamburg Bar are all at work, most of them doing well. On his trip up the river he observed a number putting in cribs, among them Barton and company, Jackson and several others. Work ground has been worked in the Montezuma mine at Callaghans already this season, under the management of James B. Parker, than was moved in the entire season last year. The result will be attended with success. The Campbell hydraulic mine at Quartz Valley is being worked at its greatest capacity, 25 or 30 men being employed. All practical miners predict a big clean up for Mr. Campbell, and his enterprise certainly deserves it. He has done more for his country during his short residence, than many who have been here a life-time. Lincoln and company on McAdams creek took out 112 ounces of gold in their claim in 24 hours last week. Mucker, Behne and Knight are running their arastra day and night, and crush about 60 tons a month. The Centennial Company on the Klamath are working 14 men and will put on a night force as soon as they reach the good pay which will occur in a few weeks. The Fort Jones Co. are working night and day and Sundays on the Klamath and will do well this season.

MINING NOTES.—Cor. Yreka *Union*, June 20: Work on the mine of Camp. Bailey & Woods is suspended for want of water. Other hydraulic claims on the Klamath, in Sciad valley are idle for the same reason. Mr. Martin Andrews, who has been for some time engaged in preparing machinery to open his mine, will soon be ready to go to work. The Grizzly mine on Indian creek has furnished some rich rock this year, which the company has crushed in their new stamp-mill. They had not cleaned up when I passed through last Sunday. Mr. Ed. Brown is also interested in a quartz lead on French creek which, he informs us, pays \$40 per ton. If this rich pay continues he will reap an abundant harvest. Six new arastras are being erected in and around Deadwood, over the Greenhorn divide, owing to the opening of new mines and the better prospect of old ones.

Tuolumne.

SOULSBYVILLE.—*Tuolumne Independent*, June 21: They are crushing rock in the Morris mill at Soulsbyville, from the live Oak. This is said to be good property, but little work has been done for several years. Some quartz speculators took a look at the B. O. mine, at Soulsbyville, this week, and then went across the river to look at another mine.

NEVADA.

Washoe District.

MEXICAN.—*Enterprise*, June 21: Are engaged in cutting out for a pump tank at the 3200 level. This tank will be completed and sinking resumed the first of next week. The winze will be sunk to the 3300 level as rapidly as possible, and will reach that point in eight or ten weeks. It is necessary to put in a pump tank at the 3200 level, as 200 ft is too great a distance to pump to advantage at one lift. Thus far very little water has been encountered in sinking the winze.

COMBINATION SHAFT.—The work of cutting out the station at the 2900 level and preparing for placing in position the big Cornish pump is being pushed to completion as rapidly as possible. The pump will be ready to start up about the time that the bulkhead on the 2600 level of the Chollar is completed. With the Cornish pump in operation at the 2900 level, there will be no danger in pushing exploring drifts on the level above.

BEST AND BELCHER.—The joint Gould and Curry west drift on the 2500 level is being advanced at the rate of 20 ft per week, though the rock is exceedingly hard. Owing to the heavy expenses incurred in combating the water on the 2700 level, it was deemed advisable to suspend operations until such time as the water shows signs of decreasing. They

can resume at any time, as the pumps will be kept running.

CON. VIRGINIA.—The east drift on the 2900 level has been advanced about 30 ft. Have completed repairing the C. and C. joint shaft. Have also completed a cooling-off house for the use of the miners working in the heated drift, and now have everything in good shape for withstanding the heat incident to the hot weather on the surface.

HAILE AND NORCROSS.—About 1,000 tons of ore from the deposit on the 200 level have been shipped to the Mexican mill, on the Carson river, where it is being worked. Returns from this ore will be received in a day or two. They will undoubtedly be good. Work has not yet been resumed on the 2800 level in the prospecting drifts.

ALTA.—Are pushing forward the west drift on the 2150 level as rapidly as possible. It is following the course of the diamond drill hole. This drift will settle the question of the value of the country to the west.

GOULD AND CURRY.—Good headway is making in the two crosscuts that are being run to the east on the 1200 level. The material is in a favorable formation, consisting of a mixture of quartz, clay and porphyry.

IMPERIAL.—The lateral drift from the main west drift is in Alpha ground. It shows much quartz of a favorable appearance, and the indications are good for finding ore that will pay a profit for milling.

YELLOW JACKET.—Sufficient ore is being extracted to keep the mills on the Carson river in constant operation. The exploring drifts are finding a considerable amount of ore that will pay for milling.

CROWN POINT.—Sufficient ore is being extracted to keep the mills on the Carson river in operation to their full capacity, and a considerable amount of work in the way of exploration is being done.

BELCHER.—Enough ore is being taken out to keep the mills on the Carson river in full blast, and a considerable amount of ore is being opened out ahead by the exploring drifts.

SAVAGE.—Prospecting work has not yet been resumed. The new bulkhead on the 2700 level has proved a success in every respect. Not a drop of water passes it.

ANDES.—Some paying ore is being found, and the prospecting drifts show a great deal of quartz of a favorable appearance.

CHOLLAR.—Good headway is making in the work of putting in the stone bulkhead on the 2600 level.

UNION SHAFT.—Are still repairing the drain drift on the 1600 level leading out to the Sutro tunnel.

Bristol District.

A SUCCESS.—The draft furnace test, recently made by the inventor, Mr. Bassett, at Bristol, has proven successful, so far. The other day he ran a lot of ore, from the Terror mine, owned by Dan Roeder, through the little furnace. This ore went \$62 85 in silver and 50½ per cent lead. The ore run through the furnace freely and ten bars of bullion, weighing 548 pounds, and going \$141 35 in silver, was the result. There are to be made several improvements on the furnace, after being thoroughly tested, proves a success, then all the 530 -uniting ore in this country will be worked with big profit.

The furnace turned out for the month of May 85 tons of bullion. The "Gipsy," owned by Henry Deno, is developing into a handsome property, the ore body becoming stronger and rich as depth is attained.

Columbus District.

MOUNT DIABLO.—*True Fissure*, June 21: The west intermediate drift from winze No. 5 is in 61 ft, and shows some good ore in the face. The east intermediate from the same winze shows a little ore. A drift is being driven east on some ore on the third level west of the shaft, and there is a strong ledge showing, with some good ore. The west intermediate, between the second and third levels, is in 71 ft, and shows some 2 ft of \$35 ore. The raise from the south crosscut, on the second level, is up 80 ft, and shows a little ore. The east drift from the north crosscut, on the second level, shows some 6 inches of \$75 ore. In the intermediate, between the first and second levels, the west drift is in 51 ft, and shows some \$60 quartz. The north crosscut from the west drift on the third level has been stopped; total length, 87 ft. A drift has been started on a small streak of ore cut by this crosscut. The raise from the east drift on the first level shows some \$60 ore. The station has been cut out in the incline, and sinking has been resumed. The east drift from the incline, which is to connect with winze No. 3, is in 14 ft.

Cottonwood District.

NICKEL.—Lookout is alive with mining experts, bound for the nickel and cobalt mines of Cottonwood. There are some 13 in all of these experts, most of them from the East. The hotels, livery stables and saloons are doing a good business, and considerable of the "ardent" is punished under the guise of lemonade. The mining excitement is running high, and it seems as if the long expected boom is at hand.

Eureka District.

EUREKA TUNNEL MINE.—*Sentinel*, June 20: The company are employing a force of 15 men, including the contractors at work in the shaft, which is being sunk below the 200 level from the tunnel, and will be continued to a further depth of 100 ft, at which point a station will be opened, and from which a drift will be run westerly to cut a vein of ore appearing in the shaft 10 ft below the 200 level. On the 200 level a drift is being run in an easterly direction, for the purpose of prospecting under the old ore chambers, and it already shows in spots and seams, ore of the same character and richness as that heretofore obtained in the ground above. One seam in particular stands almost vertically in the drift. The ore it carries is a fine quality of quartz, and although small at present, gives promise of more strength and thickness as followed downwards. To favor the belief in larger developments in this locality, there appears in the bottom of the drift a quantity of black oxide of manganese, carrying yellow chloride, the exact counterpart of that which characterized the ore body first discovered in the winze from the south drift from the tunnel level. This was traced downwards 150 ft, and the present discovery on the 200 level shows a continuation of the same to this depth, from where it may open out in ample proportions similar to the stopes above. The ore

seam in the shaft at a point 10 ft below the 200 level is worthy of particular mention. Its character is a yellowish carbonate, rather heavy with lead, and different from any ore previously discovered in the mine. Tests assays show that it carries over 100 ounces of silver and about 30 per cent of lead. It dips northwesterly, and its course will be crossed by the drift to be run from the 300 level. The latter point will be 800 ft from the surface, and at this depth the proprietors hope for and expect to develop ore bodies in Prospect mountain in a more compact form than those that are being continually discovered nearer to the grass roots, and there is no reason why these ore bodies should not prove to be as extensive as those of Ruby Hill. In the crosscut from the south drift, 200 level, is a small seam of ore taking its course southwesterly, on which a prospecting drift will soon be run. There are six men employed following ore from the old chambers, the yield from which contributes largely towards the payment of the expenses of prospecting the mine, which, by its new organization, is entirely freed from debt.

Mount Hope District

PROMISING.—*Cor. Eureka Sentinel*, June 20: It may be of interest to many of your readers to know where Mount Hope district is situated. It is twenty-five miles north from Eureka, on the line of the E. & P. R. R., one mile west from the road. It was formerly known as McGarry district, and like many others, it was abandoned for want of practical knowledge and the necessary development of its mineral deposits. Some years ago Hon. Thomas Wren's attention was called to this now promising and important mining region. He set men to work to prospect it. Your scribe last Sunday paid a visit to Mount Hope, and he was agreeably surprised to find there such a showing. The development is as great as any I know of that has ever been found in this country for the same amount of work done. At a depth of only 20 ft a solid mass of galena and carbonate ore is uncovered. Its extent is great, but cannot yet be accurately calculated, but it looks big. The surface shows mineral for 800 ft east and west and one mile north and south, with a mountain of porphyry for the hanging wall and quartz and lime for the foot wall. The find will average \$35 per ton, the ore averaging 35 per cent lead. The ore can be shipped to Eureka at a cost not exceeding \$2 50 per ton, and in time for \$1 50 per ton. I saw a breast-hole blasted yesterday that threw out one and a half tons, of which I leave you a sample. [Of very fine-looking galena.]—*Ed. Sentinel*. Mount Hope is a continuation of Ruby Hill, and Prospect mountain to the north. Mr. Wren deserves success for his pluck and energy in trying to find a mine. He has spent a fortune in prospecting, and he has never yet refused to help any worthy prospector.

Patterson District

ORE.—*Pioche Record*, June 21: Mr. Flower from Patterson district had some very rich ore tested lately by Mr. Kelsey, assayer for the Day Mining Company. The ore averages 107 ounces per ton. One sample went \$2,694. The old gentleman claims to have several hundreds tons of lulling ore that will average \$64 per ton.

Pennsylvania District

START UP.—*Pioche Record*, June 21: In all probability work will be started up in this district soon. Geo. Rives and McGrath arrived from Eureka on Thursday afternoon, and we learn from Louis Sultan that a satisfactory agreement will be made by all owners in the mining property.

Pioche District

WILL BE AT WORK.—*Pioche Record*, June 21: The works at Bullionville will most likely be going in less than two months. Fred Godbe has made contract for wood. The tailings are to be first roasted and then leached. All the tests having been made by this process have proven very satisfactory. Mr. W. S. Godbe is expected to arrive at Bullionville in about a week. The starting up of these works will be a Godsend to the Panicans.

Silverado District

CONCENTRATING ORES AT PINTO.—*Eureka Sentinel*, June 23: John Tregonning is concentrating ore from the Rescue mine, Silverado, at the Pinto Mill. He is making a trial of a process by which he thinks any quantity of lead ores can be made profitable. He is experimenting with a lot of 25 tons, and has so far been quite successful.

Tuscarora District

NORTH BELLE ISLE.—*Times-Review*, June 20: No. 2 crosscut, 350-foot level, has been extended a total distance of 24½ ft. Drift north, on the 70-foot level, has been advanced 10 ft.

BELLE ISLE.—Crosscut on the 450-foot level has been extended 10 ft; total length, 137½ ft. Work will be resumed in a few days in the joint Belle Isle and Navajo upraise on the "east" vein, 250-foot level.

GRAND PRIZE.—South drift on the 200-foot level advanced 39 ft. South drift on the 300-foot level advanced 37 ft. South drift on the 400-foot level advanced 22 ft. All other work progressing favorably.

INDEPENDENCE.—Fair progress has been made in extending drift north on the 400-foot level. Favorable formation continues, and a strong seam of ore was cut during the past week. Upraise from the 300-foot level was carried up 26 ft; total height, 77½ ft. There is no material change to note in the other workings.

ARIZONA.

THE SITUATION.—Prescott *Courier*, June 20: The mining situation in this county is about as follows: United Verde company continues to take out and ship copper-silver bullion by the wagon load. Their great mines look as if they never would give out. Coke is accumulating at the smelter and the company propose to be ready for a rainy day or days. The Conger property, in Cherry creek district, will soon be sending forth bullion. The company has a good mine and mill. A mill is going up in Humburg district, and many miners are employed there. A 10 stamp mill is being erected at the Kimball mine. Mr. Eaman has a large supply of Lane ore at the Black Warrior mill. Bradshaw and Turkey creek district miners have plenty of rich ore raised, but we hear of no crushing or smelting. The last shipment of 103 tons of Dosoris ore to Pueblo, netted the company several thousand dollars. Dosoris company own the Buzzard and Raven mine,

which has a big wall of rich silver ore in it. The Dosoris, Blue Dick and Mark Twain mines are given good characters by miners who have no interest in them. A mill is being fitted up on Upper Lynx creek. Mr. Clark is pumping water out of the Chicago mine, Groom creek district, and will very soon start his mill. The foregoing are about all the active enterprises we can now bring to mind. We wish there were more to chronicle. The showing does small justice to this section of Arizona, where there are, we firmly believe, scores of mines which carry ores rich enough to pay for mining and for almost any sort of decent treatment. As we have often before stated, only the richest ores will bear cost of transportation, etc., out of the territory, and it does strike our people, forcibly, that the era of big mining will not come until after the advent of the railroad.

MINING IN MOHAVE.—*Miner*, June 21: Miners in the vicinity of Stockton hill who have taken their ore to the Hackberry mill, have expressed themselves well satisfied with their treatment. J. Gail, who recently purchased the Moonbeam mine of P. Hach and Ed. Burke, took three tons of ore to the Hackberry mill, from which he realized over \$1,000. Mr. Foreman, of the Pueblo smelting works, is still in Kingman, and has several carloads of ore already piled up on the platform at the depot ready for shipment to his company as soon as the road is repaired. He informs us that his company has recently added three forty-ton galena furnaces to their capacity, and that the company want 20 tons of lead ore per day more than heretofore. Tiburcio Padilla brought up a sack of ore from his new strike in Cedar district, and had it sampled at the Kingman sampling works. It assayed at the rate of 224 ounces in gold, or \$4,480 per ton. Tiburcio says the sack full he brought up was from the surface croppings, and that he has plenty more of the same kind.

COLORADO.

MINING NOTES.—*Colorado Mining Gazette*, June 20: A force of 10 men is working on the Eclipse mine, Cascade mining district. Another body of high-grade ore has been struck in the Gold Leaf mine, Soda creek. The Silver Plume mill has closed down for repairs. New machinery is to be added. John M. Dumont, Esq., purchased the Ninth mine, near Empire, last week, paying \$60,000 for it. W. P. Ferris & Co. had a run of 21 tons of Joe Reynolds ore this week, which netted \$4,917. Mr. Charles Thompson, who is leasing on the Thunderbolt lode, Ute creek, is extracting good ore that pays well. The mining outlook has never been as favorable as at present for Idaho Springs. It has been an agreeable surprise to our energetic mill men. There is a great deal of prospecting being done in Gold Dirt mining district. Quite a number of location surveys have been made the past week. Seven hundred feet of six-inch air pipe has been placed in the Foxhall tunnel this week. They are now working day and night on this enterprise. Work was started up this week on the main working shaft of the Saratoga mine, Russell district. It is reported that prospecting by deep sinking will be the object of the management.

IDAHO.

THE COLORADO CON. PLACER.—*Coeur d'Alene Eagle*, June 20: Work on this valuable property has been delayed by continued high water, caused by the mountain storms which have prevailed during the week and which swelled the creek to a point where work cannot be done to good advantage. On Tuesday a force of men started in to sink to the bed of the old channel, the rim of which is exposed for a distance of several ft. A pump has been put in which does good work and the men are sinking through a gravel that pans out some famous prospects. Offers have been made by responsible parties to run a timbered drift for 300 ft for no other pay than the privilege of washing the dirt extracted. The proprietors, Messrs. Curry, Baker, Lee and Parker, are delighted with the prospects in sight.

EAGLE DISTRICT.—Nothing speaks more favorably for the growth of a mining camp, than its division into districts. Originally Coeur d'Alene district embraced all of Shoshone county, except the Pierce district. The next district to be organized was Summit, then Beaver then Evolution and now Eagle district steps forward with another organization. In each of these districts good placer and quartz claims have been found, and each possess the elements to make lively little camps. None of the districts, however, have a really good set of district laws, hence the development of claims will be retarded a greater or less time, depending upon the enterprise of claim owners and their faith in the value of their ground. A more insane and senseless law, than the 20 acre placer claims, never lumbered the U. S. statutes, and while that disgusted monopoly remains a law, it is idle to look for practical development. Twenty acres of creek ground is too much for a placer claim. It is not a mining claim, but a ranch. We wish some retroactive law could be secured, that would give us a new deal all around.

ANOTHER MINE SOLD.—Last week a gentleman from Maine, named Snow, visited Dream gulch to see the Webfoot claim, and after seeing that famous elephant, went on up the creek to inspect the quartz ledges with which that gulch is seamed. Arriving at Frank Reed's Lucky Baldwin, he was so impressed with the character of the quartz and the formation, that he immediately bonked the mine for New York capitalists for \$10,000 paying also a handsome spot cash forfeit in case the dicker falls through. The Lucky Baldwin is a good mine and is worth every dollar of the bond.

THE CUSTER CO.—*Cor. Keystone*, June 20: The Custer mill, 30 stamps, has been running regularly, with a yield of \$40,000 to \$50,000 per month. The yield has not been much less on an average, than \$1,000,000 per year. The bullion is about one-third gold. A winze sank 60 ft below the floor of the lower tunnel of the Charles Dickens, with levels run east and west, give a showing of four or six feet of ore, with a high average. The higher grade is stored in the mine, and the lower grade is on the dump and in the ore houses, of which there are 5,000 or 8,000 tons. There are three veins in the Dickens location, and each of them rich. The mine is opened to a depth considerably over 300 ft. The Montana mine, on Mount Estes, had over 400 tons of ore worked in the Custer mill, the gross yield of which was \$98,000. There is considerable shipping ore out. This mine is

also over 300 ft deep, and good ore in the bottom, between 35 and 40 tons of ore from the Whale, sent to the Custer mill, sampled over \$400 per ton. To all appearance the Whale is one of the best locations in that section. The camp employs about 250 men, and the population of Bonanza and Custer, including the men about the mines, keeps at its usual standard—probably 350. Nearly all the Stanley Basin country was brought up last season by a Wood River and Nebraska company, and it is the intention to bring in a large ditch from the Basin and tributary creeks with which to work the extensive placers. There is a new quartz camp struck between Stanley and Cape Horn, and the ores so far assay well. On Loon creek there will be more done this season than for years past, both in placers and quartz. Several companies are at work there now.

ANOTHER STRIKE IN TENDERFEET.—*Wood River Times*, June 18: Gophers and "tenderfeet" have proved the best prospectors that this country has had, so far. This saying is rapidly acquiring the dignity of a truism, as events seem to justify it. Only a few weeks ago it was reported that two "tenderfeet" had struck an ore vein up Quigley gulch, at a point scarcely four miles from and in full view of Hailey. This report was well founded. The vein was struck April 12th, and since then has been uncovered in several places, and found to average four feet in width. The vein carries two streaks of pay ore, the best of which yields 146 ounces silver and 65 per cent lead; while the second grade carries 116 ounces silver, and 40 per cent lead. The vein lies between quartzite and lime, and is well defined. About eight tons of first-class ore on the dump will be hauled in as soon as the roads will permit.

THE MAYFLOWER ORE VEIN.—As has before been stated in this paper, the Mayflower Mining Co. have for nearly two years past, been looking for a continuation of their vein on the lower level, which, owing to a "fault" or displacement, had been lost. After running over 130 ft from the line of the old workings they reached ledge matter, and, day before yesterday, cut into an ore vein having precisely the same characteristics as the old vein, and being evidently a continuation of the same. This proves the continuity, in depth, of the main mineral belt of this country beyond any doubt, and it is, therefore, as good as demonstrated that this belt extends from the Minnie Moore to and beyond Bullion.

MAGGIE D.—Work on the Maggie D. placer, just above town, is being pushed as fast as enterprise can do it. The China pump has been doing good work, and the shaft has obtained a depth where another pump is necessary. The second pump was put in on Monday and it is now expected to reach bedrock very soon. The pump may be worked by hand, but a ditch 1,400 feet long will bring water from Pritchard creek with a head of ten feet, which, with an overshot water wheel, will furnish power to work the pump night and day. The pump thus takes the place of a bedrock drain. The shaft will be sunk to bedrock, upon which drifts will be run, and the property thoroughly developed. If it proves to be as valuable as expected, hoisting works will be erected by which the pay dirt will be hoisted to the sluice boxes, which will be abundantly supplied with water from the supply ditch after it has done service in turning the overshot wheel. At the start, considerable waste will have to be hoisted with the pay, but after a single drift has been worked out, it will furnish an underground waste dump, where may be stowed the rock and gravel which is easily separated from the pay dirt. The plan seems entirely feasible and is likely to furnish a solution to the difficulty of working our deep wash claims, which will result in the development of the entire lower gulch.

MONTANA.

ANACONDA.—*Cor. Butte Miner*, June 20: We have been three weeks making up our mind in regard to this camp, and the more we see and the more we reflect the greater is our wonder and surprise at the present state and future prospects of the year-old town. Leaving the busy camp with its ceaseless noise and hammer, saw and plane, and its litter of shavings, brick, mortar and lumber, we cross Warm Spring river, pass over a meadow-like green, shaded by fragrant balm of Gilead trees, and take a look at the new works. The buildings are simply immense. We try to imagine the scene when 28 furnaces are in full blast in the smelter building and the concentrating machinery is in motion. The preparations for active work are everywhere noticeable. The acres and acres of cord wood piled compactly in long rows make a sight to remember. Then there is the brick yard, and the lumber yard, and the stone walled tunnel leading from the works to the river.

The Alice is looking exceptionally well on the south vein and a heavy production continues; not much is being done on the main ledge. A report was current some time ago of a probable resumption of sinking in the main shaft to a depth of 1,000 ft, but work has not been completed yet despite the encouraging appearance and heavy productiveness of the south vein. The Magna Charta holds up in good shape and contributes its usual quota of ore to the mills. The Mountain View improves with every stroke of the pick and may prove the second copper mine of the district. Owing to the pluck, enterprise and brains of C. N. Larabee it has been opened to a depth of 500 ft and the only machinery used up to within two months ago was a second-hand whim and a bobtailed horse. It was the most primitive hoist ever employed to sink a shaft to that depth. Mr. Larabee is now taking out plenty of ore from the north and south veins and has enough ore in sight to justify the erection of a 100 ton smelter. The Liquidator is looking well and will soon be fully opened from the 300-foot station. The Lexington is looking well in all the levels, and the bullion which for some time has been quite base is now of satisfactory fineness, thus showing an improvement in the mill workings. The Company has on hand a surplus in the Paris office, from which Judge Davis, while in a confidential mood recently, told a reporter another dividend would soon be declared. The Poser is making a good record and shows plenty of ore in the lower level. The last lot shipped to the Silver Bow mill sampled 76 oz. The vein, however, will not sample that much. There is a report on the street to-day that operations are to be resumed on the Stevens soon. It is a good mine and ought to be worked. The Moulton is running along smoothly, and the 200, 300, 400 foot slopes are producing well. Another dividend may soon be ex-

pected. It will be an honest dividend, as the Company is out of debt.

THE LEADING PROSPECTS.—*Inter Mountain*, June 19: The shaft on Clark's Colusa is being rapidly sunk to the 300-foot station and is now 240 feet deep. In the east and west drifts from the 100-foot station, stoping is progressing, the output being from 25 to 30 tons of copper ore. The total length of the level is 175 ft. In the 200-ft level the stopes are also being worked both east and west of the shaft, the output being about 40 tons per day. The shipments in April were 700 tons, in May 400 tons and in June will approximate 500, which amount would be doubled if the sinking of the shaft did not retard operations. The shipping ore carries from 30 to 40 per cent copper. In addition to the ore shipped, about 12 tons a day have been sent to the Colorado smelter for the past three months for reduction into matte, and about 40 tons assaying from 12 to 18 per cent, have been extracted and dumped as third-class ore. To treat the vast quantity of low grade ore available for extraction, it is the purpose of the company to build a 60-ton concentrator, for which plans have already been drawn and accepted. Very little is heard of the Bell now-a-days, as the management is reticent and tries to keep very dark. It is a fact, however, that a bonanza has been found in the west 400 ft drift, and that the smelter is in very profitable operations. This will be denied but it is a fact, all the same. To use a homely phrase, the Bell smelter is making money "hand over fist," and is working daily from 25 to 30 tons of excellent copper ore, running high in silver. The Montana smelter is maintaining its splendid record. The company is so confident of the future of the mine that the management recently threatened to build a big refinery east if a contemplated pooling arrangement was perfected between European and Chilean producers, and to give the pool a lively deal.

NEW MEXICO

ORGAN NOTES.—*Cor. Rio Grande Republican*, June 21: The smelter will run on galena ore next week if the fuel holds out. Another car load of copper bullion was shipped from the Memphis. They have made another good strike in the Silver Gem, in a different part of the lead. The whole face of the drift in the 150-foot level in the Memphis is now said to be in good ore. Fourteen men are at work on the Silver Gem, ten or twelve of whom are doing development work and the others are stoping out ore for shipment. Work will again go on at the Little Buck next week. Ore will be delivered daily at the smelter, principally low grade, a considerable quantity of which is on the dumps. Our miners will now be encouraged to bring their ore in from the different prospects, for the smelter company will undoubtedly give for the ore all it is worth after sampling. The wagon load of ore brought in last week by McLoughlin and Mayberry from the Saratoga claim, in the San Andres, for a mill run, yielded 27½ per cent copper. And they claim to have a big body of it. Brown and Clark have again commenced work on the Black Prince. It is generally believed that this property can now be worked at a considerable profit, as they have shipped one car load to Colorado, which, after paying the enormous freight, left a sufficient margin to reimburse them for the labor expended, and a profit besides. The Poor Man's Friend, about three-quarters of a mile southeast of the Memphis, is a very promising claim belonging to Captain Richards and others. It has a thirty-foot tunnel running in, and four shafts on the vein averaging 18 ft each, all in ore. The vein is a good wide one, and the mineral is galena, chlorides and black sulphures, assays from which run from 14 to 120 ozs. silver.

OREGON.

NEWS.—*Jacksonville Times*, June 20: Considerable prospecting is being done in Jackson and Josephine counties. A successful run is being made at Wimer & Co.'s mine near Waldo. It is proposed to clean up there soon. Roten & Sons are taking some quartz from their ledge in Willow Springs precinct, which shows considerable free gold. John Rush of Evans creek has discovered a chrome deposit, which promises to be valuable, as it is extensive and evidently of good quality. The Sterling Company's ditch is still running a full head and two pipes are kept busy. The snow in the mountains is nearly gone, however. Cleaning up will be commenced before long.

UTAH.

PARK NOTES.—*Record*, June 21: The Ontario company is taking advantage of the present high water in the creek running down the canyon, to wash away the dump at the mine. Quite a large amount of prospecting is being done on the west side of Thayne's canyon. Prospectors have great faith in the future of that side. Roscamp and Glenn have made a new discovery in a claim called the Columbia. The vein is between a white silicious lime and quartzite and galena. The claim is near the Black Bear. The Bon Homme Co. have begun sinking a shaft on their property up the left hand fork of Thayne's canyon. This was made necessary by the foul air they encountered in the other workings. A contract has been let to Mr. Wm. Connor, to drive a tunnel 250 ft on the Crystal Mine, in the Big Cottonwood district. This property is owned by Salt Lake parties. Mr. Connor will start work on his contract as soon as he can get over in that part of the country with supplies. The Pioche *Record*, says: The property of the Christy S. M. Company, at Silver Reef, was not sold on the day advertised, as the company have made arrangements to settle all indebtedness and resume work. Capt. H. S. Lubbock, Supt., is expected to arrive at Silver Reef at any moment. The Reef still lives.

THE SWANSEA.—Yesterday a fine body of ore carrying 40 per cent of copper was struck in the Swansea. About two weeks ago this property was bonded to Mr. J. P. Ewing, of San Francisco, by Dr. Sarchet, J. C. Baker and Wm. Thompson. Mr. Ewing put in a steam pump immediately, and commenced sinking in the old shaft. At the depth of 105 ft a vein of two and a half ft in width, sampling as above stated, was struck yesterday. Mr. Ewing is to be congratulated upon his fine prospects. The mine lays directly east of the Colusa and in a belt that has not yet failed to develop good mines when depth was attained.

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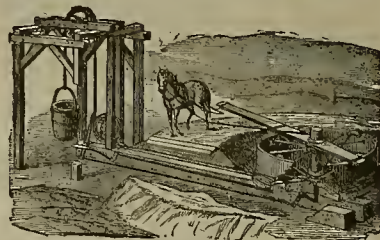
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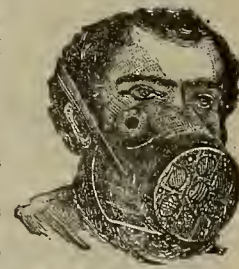
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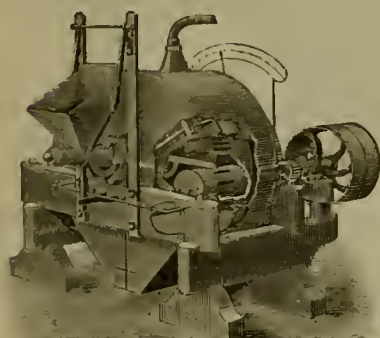
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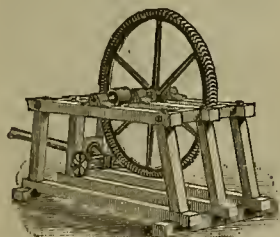
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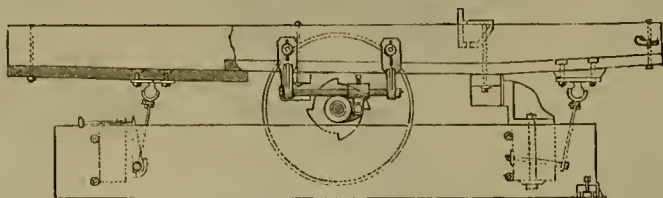
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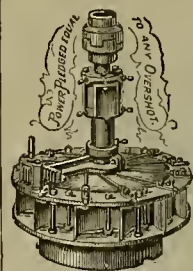
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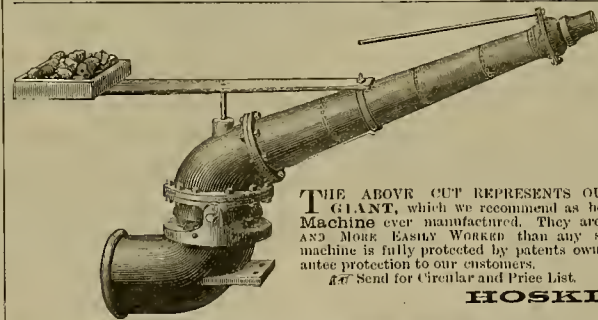
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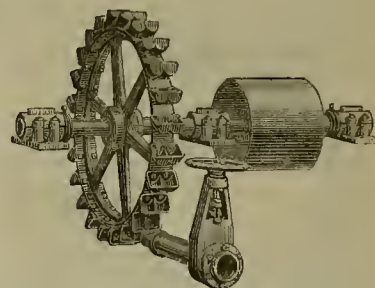
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MARKS

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List of U. S. Patents for Pacific Coast Inventors.

(From the official list of U. S. Patents in DEWEY & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.)

FOR WEEK ENDING JUNE 17, 1884.

300,705.—FASTENING FOR BOWS OF WATCH CASES—D. Glickman, S. F.
 300,184.—CONCENTRATOR—Ernest Koch, S. F.
 300,492.—CABLE GRIP—R. W. McGovern, S. F.
 300,735.—SLATE PENCIL SHARPENER AND SPONGE HOLDER—Price, Cook & Price, S. F.
 300,511.—WATER COOLER AND REFRIGERATOR—C. S. Richman, Vallejo, Cal.
 300,515.—RIFLING GUN—Alois Schneider, S. F.
 300,656.—SKATE SHARPENER—Xavier St. Pierre, Osceola, Nev.
 300,408.—CLAMP FOR WIRE ROPES—Henry R. Taylor, S. F.
 300,410.—ELECTRIC CONDUCTOR—A. C. Tichenor, Alameda, Cal.
 300,701.—WRT ORE CONCENTRATOR—W. B. Farwell, S. F.
 300,479.—ORE CONCENTRATOR—Kennedy & Nesbit, Silver Reef, U. T.
 4,151.—LABEL—Horne & Abel, Los Angeles, Cal.
 NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Mining Share Market.

The main topic of interest in connection with the stock market is the combining of work of several companies to prospect at one point—the Mexican winze. The business men at Virginia do not like this very much because it causes the "knocking off" of a number of miners, but it will doubtless be best in the long run for the stock market and for shareholders. The *Enterprise* says: Had the masses thoroughly understood the meaning of the new plan of prospecting, there would have been no alarm to subside, as there was really no cause of alarm. However, any change from the beaten path is made cause of alarm, both in mining and governmental affairs, by petrified conservatives. Had the northern companies continued drifting about in the neutral straits above ad infinitum, the conservatives would have viewed the operation with perfect complacency, if not with an occasional feeling verging upon enthusiasm. Now, when the companies in question determine to go at once to the core and heart of matters, these men are disturbed; their easy, old-time equilibrium is shaken. However, all this will be forgotten the moment any decided improvement is announced in the Mexican deep winze—the deepest vertical excavation on the face of the earth.

At Gold Hill all is now going on well, and a large amount of ore is being extracted and milled. At the south end nothing is being done save in the Alta, at which mine they have started in to solve the problem as regards the country to the west at the depth of 2,150 ft.

Hill's Triumph Ore Mill.

The following statements concerning the Hill Triumph Ore Mill, will be of interest to quartz miners:

SONORA, June 8th.
 Mr. F. A. HILL:—My visit to the Pampa Hill mine yesterday to see your new mill worked pleased me very much. It is the best I have seen. I have been engaged in milling silver and gold ores for the past 15 years.

HENRY MEDICOT.

GRASS VALLEY.
 Mr. F. A. HILL:—As to my impression of your mill, I will say, it does its work well; and from its simplicity, the small power required to run it, the quantity which will work, and the price it can be sold for, the small expense to put them running when on the ground, makes me think they will prove the best thing I have seen.

STEVE MOORE.

SONORA, June 8th.
 Mr. HILL:—Our visit to the mine yesterday to see your mill worked pleased us very much. The mill seemed to do as much or more than you have claimed for it, considering the work it will do, and cost of machine. It is a valuable invention, and we are pleased to congratulate you on its success.

A. J. SWETSER,
R. B. LANK,
J. MILLER.

GRASS VALLEY, May 8.
 F. A. HILL:—In reply to your inquiry of my opinion of your new mill, I am pleased to say, after a careful examination and watching it work, I think it a wonderful success. The machine I saw, with very little power—no more than four horses—crushed as fast as a 10-stamp battery. I worked in an 8-stamp custom mill, in every capacity, for over 8 years.

CHAS. W. KITT.

SAN FRANCISCO, May 15th.
 F. A. HILL:—After having seen fully 1,500 pounds of granite fed through the rock breaker into your new mill and come out through a No. 7 screen within an hour, we feel justified in saying that the mill will do all you claim for it, in a most satisfactory manner. The construction seems strong and durable.

S. W. SHAW,

S. S. SWERTY, M. E.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove walked with aquaria is constantly receiving additions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alaska M Co.	California.	5.	1.50.	June 23.	July 28.	Aug. 14.	A. Judson.	320 Sansome st
Belmont M Co.	Nevada.	37.	15.	May 26.	June 30.	July 24.	J. W. Pew.	310 Pine at
Bullion M Co.	Nevada.	29.	25.	May 19.	June 20.	July 10.	J. M. Brazell.	328 Montgomery st
Butte Creek Hyd. M Co.	California.	9.	10.	May 13.	July 10.	July 30.	E. L. Taylor.	230 Montgomery st
California M Co.	Nevada.	12.	20.	May 20.	June 27.	July 24.	C. P. Gordon.	303 Montgomery at
Cueva Santa M Co.	Mexico.	2.	10.	May 19.	June 24.	July 15.	W. Letts Oliver.	328 Montgomery at
Columbus Con M Co.	Nevada.	3.	25.	June 2.	July 7.	July 28.	J. M. Burlington.	309 California at
Champion M Co.	California.	15.	10.	June 13.	July 17.	Aug. 6.	T. Wetzel.	322 Montgomery st
Dayton M Co.	Nevada.	12.	20.	May 16.	June 20.	July 16.	E. M. Hall.	357 Pine at
Equitable Tunnel M Co.	California.	28.	10.	Feb 12.	May 26.	June 30.	W. Van Bokkelen.	419 California at
Eintracht Gravel M Co.	California.	15.	05.	May 13.	June 28.	July 17.	H. Knuz.	209 Sansome st
Excelsior Water Co.	California.	6.	50.	Jan 23.	July 1.	July 29.	H. B. Wheaton.	215 Sansome st
Golden Channel Drift M Co.	California.	1.	03.	May 22.	June 23.	July 25.	A. B. Paul.	328 Montgomery st
Grand Prize M Co.	Nevada.	16.	25.	May 16.	June 20.	July 16.	E. M. Hall.	357 Pine at
Gould & Curry S M Co.	Nevada.	48.	50.	June 6.	July 11.	Aug. 4.	A. K. Durbin.	309 Montgomery at
Hale & Norcross S M Co.	Nevada.	82.	75.	May 10.	June 12.	July 2.	J. F. Lightner.	309 Montgomery at
Indian Spring Drift M Co.	California.	2.	05.	May 3.	June 5.	July 2.	A. B. Paul.	328 Montgomery at
Loreto M and M Co.	Mexico.	7.	50.	May 21.	June 23.	July 9.	H. G. Jones.	327 Pine at
Mammoth Bath M Co.	California.	1.	15.	June 9.	July 11.	Aug. 1.	J. W. Pew.	310 Pine at
Mayflower M Co.	California.	24.	10.	May 9.	June 12.	July 7.	J. J. Morio.	328 Montgomery st
McElroy Gravel M Co.	California.	11.	10.	May 7.	June 10.	July 10.	E. W. Levy.	604 Merchant at
Mexican G M Co.	Nevada.	27.	75.	June 11.	July 16.	Aug. 6.	C. E. Elliott.	309 Montgomery at
Mono Lake M M Co.	California.	1.	50.	May 19.	July 2.	Aug. 18.	P. F. Mohrhardt.	311 Montgomery at
Mono M Co.	California.	1.	1.00.	June 11.	July 11.	Aug. 30.	C. S. Neal.	309 Montgomery at
North Peer M Co.	Arizona.	1.	2.00.	June 12.	July 17.	Aug. 11.	H. Deas.	309 Montgomery at
Peer M Co.	Arizona.	1.	25.	June 6.	July 15.	Aug. 5.	A. Waterman.	309 Montgomery st
Potosi M Co.	Nevada.	15.	25.	May 29.	July 1.	July 22.	C. B. McCoy.	309 Montgomery at
Robinson M Co.	California.	11.	15.	May 21.	June 18.	July 1.	P. F. Mohrhardt.	311 Montgomery at
Starlight M Co.	California.	1.	06.	June 14.	July 18.	Aug. 6.	W. Battles.	513 Market at
Silver Hill M Co.	Nevada.	20.	05.	June 2.	July 8.	July 29.	W. E. Dean.	309 Montgomery st
Sierra Nevada M Co.	Nevada.	73.	1.00.	May 10.	June 12.	July 2.	E. L. Parker.	309 Montgomery at
Segregated Belcher M Co.	Nevada.	22.	1.00.	May 9.	June 11.	July 1.	G. D. Edwards.	414 California at
Union Con M Co.	Nevada.	27.	50.	June 9.	July 14.	July 31.	J. M. Burlington.	309 California at
Utah S M Co.	Nevada.	49.	50.	June 19.	July 25.	Aug. 13.	C. Pratt.	309 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Belmont M Co.	Nevada.	J. W. Pew.	310 Pine st.	Annual.	July 11
Cons Reforma M Co.	Mexico.	J. E. Hill.	310 Pine st.	Annual.	July 7
El Dorado South Cons. M Co.	Nevada.	D. M. Kent.	330 Pine st.	Annual.	July 7
Union Con M Co.	Nevada.	J. M. Burlington.	309 California st.	Annual.	July 2
Excelsior M Co.	Nevada.	T. J. Wattson.	114 Davis st.	Annual.	July 3

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bonanza King M Co.	California.	D. C. Bates.	309 Montgomery st.	25.	May 15
Bodie Con M Co.	California.	G. W. Sessions.	309 Montgomery st.	50.	June 5
Deerbe Blue Gravel M Co.	California.	T. Wetzel.	322 Montgomery st.	10.	May 27
Elmer M Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Apr 2
Jackson M Co.	California.	D. C. Bates.	309 Montgomery st.	10.	Mar 16
Kentuck M Co.	Nevada.	J. W. Pew.	310 Pine st.	10.	June 19
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery st.	10.	Apr 28
Standard Con M Co.	California.	W. Van Bokkelen.	309 Montgomery st.	25.	Mar 15
Syndicate M Co.	California.	J. Stoddard.	419 California st.	10.	Apr 2

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 5.	WEEK ENDING June 12.	WEEK ENDING June 19.	WEEK ENDING June 26.
Alpha.	..	..	60	65 60 70
Alta.	1.70	2.05 1.50	1.95 1.60	1.75 1.70 2.20
Andes.	..	30 25 30	..	25 20 20
Ariz.	..	..	..	..
Belcher.	1.00	..	70	85 70 80
Belding.	..	..	..	..
Best & Belcher.	1.80	1.95 1.60	1.90 1.00	1.60 1.15 1.70
Bonanza King M Co.	..	10 20 25	25 20 45	..
Bodie Con.	..	55 55	55 50	60 60 80
Bodie Con.	3.80	4.00 3.40	4.30 3.70	4.30 3.95 4.45
Benton.	..	50 55 35	50 45	50 50 60
Bodie Tunnel.	..	..	..	..
Bulwer.	..	75 60 70	..	60 65
California.	..	10 10 15	05 10 05 25	..
Challenge.	..	..	..	..
Champion.	..	..	..	..
Chollar.	..	..	1.50 1.50	1.65
Consolidated.	1.00	85 90	..	..
Con. Imperial.	..	..	..	..
Con. Virginia.	15	20 15 20	10 20 10 20	..
Con. Pacific.	..	..	..	..
Crocker Point.	1.20	1.05 1.15	1.10 1.25	1.15
Day.	1.75	1.90	1.25	1.25
Eureka Con.	2.55	2.00	3.00	2.00 2.10
Eureka Tunnel.	..	..	..	..
Excelsior.	..	25 20 10	..	30 30
Grand Prize.	1.05	1.25 1.80	1.15 35	35 50 70
Gould & Curry.	1.05	1.25 1.80	1.15 35	35 50 70
Goodshaw.	..	..	..	..
Hale & Norcross.	1.80	2.20 1.50	2.45 2.25	2.60 2.45 2.80
Holmes.	..	..	..	..
Independence.	..	25 30	25 35 40	..
Julia.	..	..	..	..
Justice.	25	30 20 25	..	20 25
Martia White.	..	..	..	..
Holmes.	..	..	..	..
Mexican.	1.35	1.60 1.00	1.55 50	1.05 1.05 1.05
Mt. Diablo.	..	2.30	..	2.10
Northern Belle.	..	..	..	..
Nevado.	3.15	3.20 3.00	3.15 3.15	3.45 3.40 4.30
North Belle Isle.	..	25 15	..	..
Ocidental.	..	..	1.00 90	1.00 90
Ophir.	90	1.20 1.00	1.10 60	1.05 70 95
Overman.	..	20 30	20 15	..
Potosi.	35	50 35 40	40 45	40 45
Placer Con.	..	..	..	..
Savage.	65	75 65 70	60 75 70 75	..
Seg. Belcher.	..	35 140	..	..
Sierra Nevada.	80	1.10 50	1.50 1.00	1.55 1.00 1.10
Sierra Hill.	..	5.50	..	..
Silver King.	..	..	..	..
Scorpion.	..	20 25 30	10 15	10
Syndicate.	45	65 45 65	45 50	50 50 60
Tioga.	..	..	..	..
Union Con.	1.40	1.35 1.35	1.40 1.00	1.60 80
Uta.	..	60 75 55	75 35	50 40
Yellow Jacket.	1.75	1.80 1.60	1.80 1.60	1.90 1.75 1.80

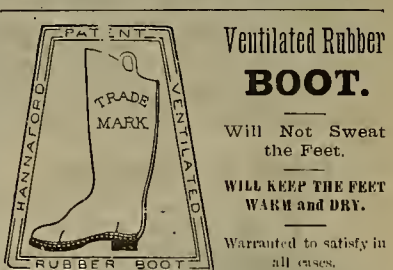
San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, June 26, 1884.	
ANTIMONY—Per pound.	14 @ 15
BOAX—Per Pound (extra).	16 @
IRON—(Glenarneckton).	254 0 @
Eglinton, ton.	20 00 @
American Soft, ton.	29 00 @
Oregon Pig, ton.	32 50 @
Chaparral, Nos. 1 to 4.	32 50 @
Refined Bar.	31 @ 3
Horseshoes, keg.	5 50 @
Nai Rod.	73 @
Norway, according to thickness.	65 @ 73
Swedish, English, B.	16 @ 16
Black Diamond, ordinary.	14 @
Drill.	15 @
Machinery.	12 @ 14
COPPER—Ingot.	22 @
Brass, sheet.	20 @
Fire-box sheets.	28 @
Bolt.	25 @
Old.	8 @
Bar.	12 @
Copper, 100 fine.	12 @
Lead—Pig.	41 @ 1
Bar.	40 @
Pipe.	7 @
Sheet.	8 @
Shot, discount 10% on 500 bag.	2 10 @
Buck, 2 bag.	2 30 @
Chilled, do.	2 50 @
TIN PLATES—Charcoal.	7 00 @ 7 25
Coke.	6 00 @ 6 75
Galv.	6 25 @
1 C. Charcoal roofing, 14x20.	6 25 @ 6 50
ZINC—By the cask.	19 @
Sheet, 7x3 ft, 7 to 10 lb. less cask.	9 @
NAILS—Assorted sizes.	3 50 @
QUICKSILVER—By the flask.	29 00 @
Flasks, new.	1 05 @
Flasks, old.	85 @

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 "Have proved the best rubber boot I have ever worn. They do not sweat or tire the feet."—Dr. W. L. McCleary, Washington, Pa. 1111 Boots sent C. O. D., \$6.50.
 E. T. ALLEN,
 Agent for Pacific Coast, 410 Market St., San Francisco.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Company.
 ASSESSMENT No. 48.

Levied, .. June 6, 1884.
 Delinquent, .. July 11, 1884.
 Day of sale, .. August 4, 1884.
 Amount, .. Fifty cents per share.
 ALFRED K. DUBROW, Secretary.
 OFFICE—Room No. 69, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half-year ending June 30, 1884, the Board of Directors of the GERMAN SAVINGS AND LOAN SOCIETY has declared a dividend on Term Deposits at the rate of four and thirty-two one-hundredths (4 32-100) per cent per annum, and on Ordinary Deposits at the rate of three and six-tenths (3 6-10) per cent per annum, payable on and after the 1st day of July, 1884. By order
 GEO. LETTIE, Secretary.

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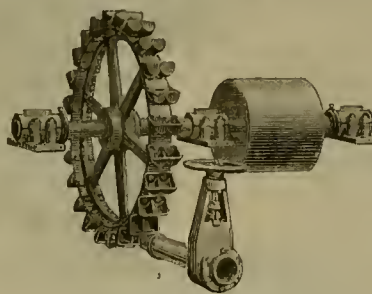
SOLE AGENTS FOR

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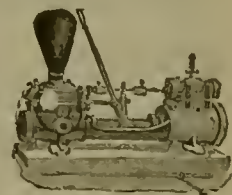
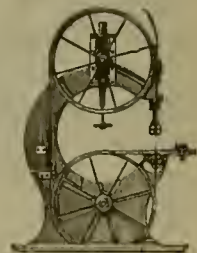
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Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pump,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co's Wire Rope.

**PELTON**
HURDY-GURDY WATER WHEEL.

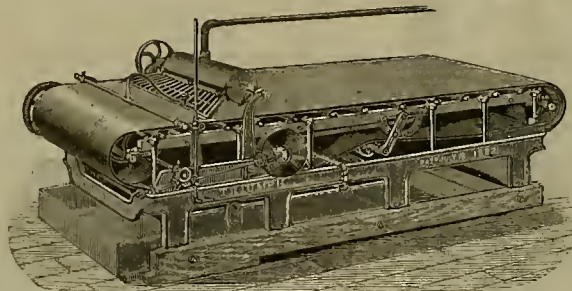
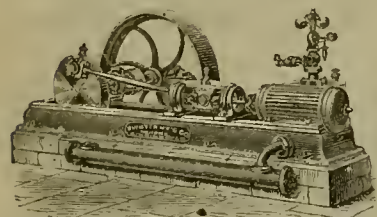
Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
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Harrington's Screw Hoisting Machines,
Lefel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
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The Standard.**JOSHUA HENDY MACHINE WORKS,**

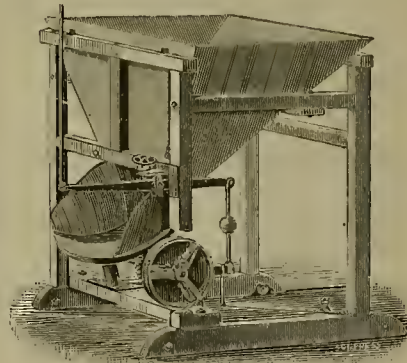
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These lubricants have been for the last eight years, and are now, in general use in nearly all the mills, mines and steamers on this Coast, and the fact that the demand constantly increases is sufficient evidence of their superiority.

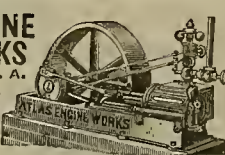
MINING ENGINEER.

Wanted, by a thorough, competent and experienced
Mining Engineer and Metallurgist, to take charge of a
mine or mill. Best references. Address 318 Pine street,
San Francisco, care of Rustel & Co.

Dewey & Co. { 252 { Patent Ag'ts.Send for
Catalogue
and
Prices.**ATLAS ENGINE WORKS**

INDIANAPOLIS, IND., U. S. A.

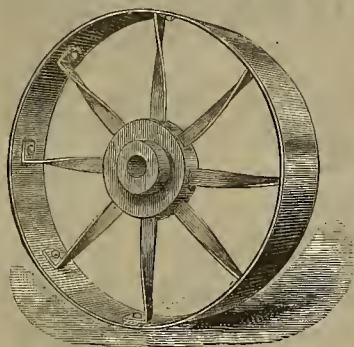
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STEAM ENGINES & BOILERS.Carry Engines and Boilers in Stock
for immediate delivery.**California Inventors**

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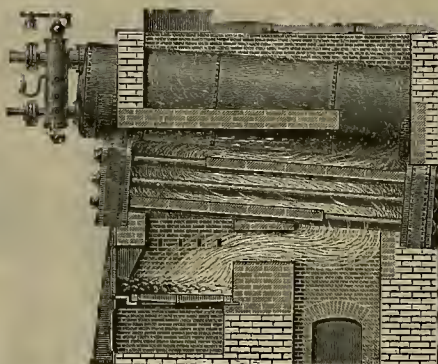
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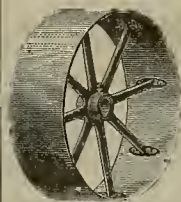
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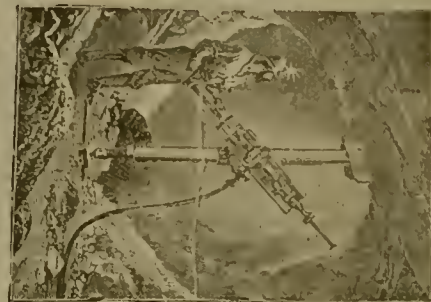
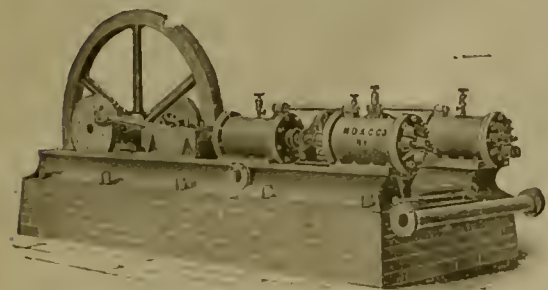
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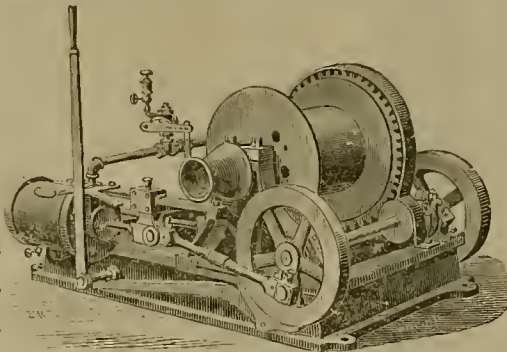
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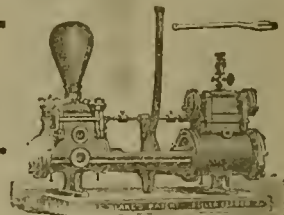
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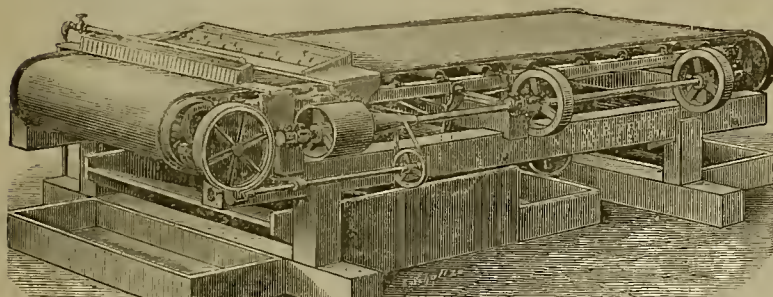
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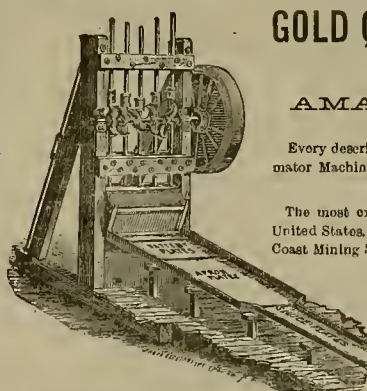
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